Universidade de Aveiro Departamento de Economia, Gestão e Engenharia Industrial
2014

ANA FILIPA FERNANDES AGUIAR BRANDÃO

INOVAÇÃO EM TURISMO: O PAPEL DOS SISTEMAS REGIONAIS DE INOVAÇÃO

INNOVATION IN TOURISM: THE ROLE OF REGIONAL INNOVATION SYSTEMS

Universidade de Aveiro
2014
Departamento de Economia, Gestão e Engenharia Industrial

ANA FILIPA FERNANDES AGUIAR BRANDÃO

INOVAÇÃO EM TURISMO: O PAPEL DOS SISTEMAS REGIONAIS DE INOVAÇÃO

INNOVATION IN TOURISM: THE ROLE OF REGIONAL INNOVATION SYSTEMS

Tese apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Doutor em Turismo, realizada sob a orientação científica do Doutor Carlos Manuel Martins da Costa, Professor Catedrático do Departamento de Economia, Gestão e Engenharia Industrial da Universidade de Aveiro, e do Doutor Dimitrios Buhalis, Full Professor na Universidade de Bournemouth.

Apoio financeiro da FCT e do FSE/POPH no âmbito do QREN

I dedicate this thesis to my mother and father.
Mum, my best friend... You are and always have been the highest example of the person I one day wish to become.
Dad, thank you for being a warrior, for always making me laugh, for being by side at all times. You are my Guiding Star...
Thank you both for nurturing such a loving and caring family!

o júri

presidente

Prof. Doutor Manuel João Senos Matias
Professor Catedrático da Universidade de Aveiro

Prof. Doutor Carlos Manuel Martins da Costa
Professor Catedrático da Universidade de Aveiro (orientador)

Prof. Doutor Norberto Nuno Pinto dos Santos
Professor Associado com Agregação da Universidade de Coimbra

Prof. Doutor Francisco José Lopes de Sousa Diniz
Professor Associado com Agregação Aposentado da Universidade de Trás-os-Montes e Alto Douro

Prof. Doutora Ana Maria Alves Pedro Ferreira
Professor Associada da Universidade de Évora

Prof. Doutora Zélia Maria de Jesus Breda
Professor Auxiliar da Universidade de Aveiro

acknowledgements

This thesis is about networks and innovation systems. Throughout the course of this work, I have learned important lessons, both from scientific knowledge and from life. The achievement of success is hardly possible without the support of a solid system and robust networks. I am very fortunate for having both. The accomplishment of this thesis would have never been possible without so many people, to whom I wish to express my deep gratefulness for all the support, guidance, patience, motivation and friendship.

To my supervisor Professor Carlos Costa, I wish to thank him for all these years of shared wisdom. Besides the excellent scientific guidance, his friendship, support, motivation and enthusiasm are the “most central actors” of this thesis. Thank you so much for your geniality and for making me grow as a researcher and as a person. I am also deeply thankful to Professor Dimitrios Buhalis for the useful advices that highly contributed to the development of this work.

To Zélia Breda and Rui Costa, thank you for always being there for me and for helping me to overcome the difficulties faced during this hard process. Your friendship and support were crucial in so many moments! Despite the ups and downs, being near or far, we are the dream team!

To all the colleagues from the University of Aveiro and idtour, who gave me a warm welcome to this family some years ago. Isabel, José Mendes, Nuno, Carolina and José Miguel, thank you for being an important source of friendship and companionship.

To my parents, boyfriend, sister, brother-in-law and uncle, I must thank you for always encouraging me to achieve my goals and to pursue my dreams. Your constant support was an undeniable determinant for doing this thesis, as well as for all other challenges in my life. You are the rock solid part of my world.

I want to thank for the love and support of my friends, who always stood by me, despite my frequent absence in their lives. Sissi, Leonel, Carla, Lena, Cláudia, Lurdes, Ana Sousa, Ana Ramires, Susana, Nina, thank you for being in my life.

This work also owes much to the people that kindly accepted to cooperate with it. Without the information provided, it would not have been possible to conclude this thesis.

I must also express my gratitude to Fundação para a Ciência e Tecnologia for the financial support and to the University of Aveiro for providing the conditions that allowed me to successfully develop my research project.

palavras-chave

Inovação, turismo, redes, conhecimento, sistemas regionais de inovação.

resumo

Esta tese tem como principal objetivo analisar as características, a importância e o papel da inovação territorial em turismo e o seu impacto no desenvolvimento dos destinos. Consiste num estudo multidisciplinar suportado numa exaustiva revisão da literatura sobre temas como desenvolvimento, inovação e modelos de inovação territorial. Com base nas principais conclusões de natureza conceptual, considerou-se o modelo dos sistemas regionais de inovação como o mais adequado para aplicação ao sistema turístico, e a constituição de redes como estruturas fundamentais para a sua operacionalização. A partir desta abordagem teórica, foi desenvolvido um quadro conceptual para a análise da inovação sistémica no sector do turismo. Esta abordagem permitiu a definição de um conjunto de hipóteses, as quais foram testadas através dos resultados da parte empírica da tese.

Foram desenvolvidos dois estudos empíricos distintos, mas complementares nas regiões do Douro e de Aveiro. O primeiro teve como objetivo inquirir empresas turísticas, enquanto o segundo foi dirigido a instituições regionais com intervenção no sector do turismo ou na inovação. Os resultados obtidos conduziram a importantes conclusões sobre o desempenho das empresas e regiões em termos de inovação, os padrões de *networking* desenvolvidos no âmbito de processos de inovação, a importância do conhecimento existente nas regiões e os fatores específicos das mesmas para a inovação em turismo, a perceção das empresas turísticas sobre o ambiente de inovação e o seu contributo para a evolução e para o sucesso dos destinos turísticos.

A tese recorre a uma abordagem quantitativa que inclui estatística descritiva e indutiva e ao método da análise de redes (sociometria). A combinação de métodos levou a importantes conclusões sobre a inovação em turismo, com uma focalização especial no que a relaciona com os sistemas regionais de inovação. As conclusões permitem avançar com um conjunto de implicações e sugestões para futuros projetos de investigação sobre o tema, bem como para a gestão dos destinos turísticos, uma vez que contribui para um maior e mais aprofundado conhecimento do fenómeno da inovação em turismo desenvolvida a nível regional. Os resultados demonstram que diferentes regiões apresentam sistemas regionais de inovação distintos. Assim, não existe um modelo único que possa ser aplicado indistintamente em todas as regiões. Contudo, as conclusões apontam para a existência de padrões e práticas que aperfeiçoam o seu funcionamento, aumentando o desempenho ao nível da inovação, bem como a competitividade global do destino.

keywords Innovation, tourism, networks, knowledge, regional innovation systems.

abstract

This thesis analysis the characteristics, importance and role of tourism innovation developed at territorial level and its impact on destination development. It is a multidisciplinary study based on an extensive literature review on development, innovation and territorial innovation models. Grounded on the main conceptual findings, the model of regional innovation systems is considered to be the most adequate for the tourism system, and the networks as important structures for its operationalisation. From this theoretical approach, a framework for the analysis of tourism innovation systems is developed, and several hypotheses are advanced and tested through the analysis of the results from the empirical part of the thesis.

Two distinct but complementary empirical studies are conducted in the regions of Douro and Aveiro. The first is directed at tourism firms and the second to regional tourism organisations and innovation institutions. The results gathered allow unveiling important conclusions on the innovative performance of tourism firms and regions, the networking patterns developed within innovation processes, the importance of regional knowledge and regional specific factors for tourism innovation and the perception of tourism firms regarding the innovation environment and the contribution of innovation in the evolution and success of tourism destinations.

The thesis makes use of a quantitative approach including descriptive and inductive statistics and social network analysis methods (sociometry). The combination of methods brings important insights on tourism innovation, with a special focus on regional tourism innovation systems. It allows advancing implications and suggestions for future research on the topic and for tourism destinations' management, as it contributes to a better and in-depth understanding of the phenomenon of interactive tourism innovation at regional level. The results highlight that different regions present distinct regional innovation systems and thus there is no single inflexible framework to be applied to all tourism destinations. There are, however, conclusions that indicate that specific patterns and practices improve their functioning, increasing innovation performance and overall destination competitiveness.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1

Introduction

1.1 Introduction

This chapter intends to provide a general overview of the thesis. It is presented the relevance and scope of this research within the most recent theories and trends on innovation, emphasising the innovation in tourism and the importance of systemic and territorial approaches (section 1.2). The following section provides a brief presentation and justification of the adopted research process and the main objectives of the research project (section 1.3). Finally, in section 1.4, an overlook to the structure of the thesis is made.

1.2 Scope of the thesis

This thesis looks into innovation in tourism and its territorial dimension at regional level. The early studies on innovation focused mainly on manufacturing firms, which can be explained by the fact that the world's economy was based on industrial societies. As we evolved into service economy and, more recently, into knowledge economy, the research on innovation started to embrace service firms, in which tourism is included. Despite this, and the paramount importance that tourism plays in worldwide economy, theoretical and empirical studies on tourism innovation are still moderate and are mostly conceptual.

Besides this gap found in the literature, this thesis is also inspired by emerging work on interactive and systemic innovation. The acknowledgement by the researcher of the importance that the territory has in the evolution and development of tourism destinations, as these processes cannot be detached from it, lead into a path focusing on the analysis of the relation among tourism innovation, firms and destinations, conceptualised in an integrated whole. In fact, the evolution of innovation models demonstrate that the practice of innovation in firms started from linear, sequential and atomistic processes developed entirely within the scope of the firm, towards the most recent models in which firms, in order to be successful, develop their innovation in a networked environment, with strong patterns of cooperation not only with other businesses, but also suppliers, customers, universities, research centres, etc. and highly supported by interactive knowledge creation, knowledge sharing and collective learning. Thus, the territory in which innovation develops has a critical role, as it provides the necessary conditions for it to develop.

Bearing this and the discussion around the globalisation of economies and the importance of regions in mind, it is concluded that the regional level is the privileged locus for the development of successful and competitive innovations. The new paradigm is based on the understanding that the key driver of a globalised competition results from innovation developed within innovation systems. Considering that tourism is a fragmented and systemic industry, based on integrated experiences comprising all the elements of the system and closely linked to the territory, it is fundamental that innovation is developed at destination level. Moreover, tourism firms and destinations should engage in constant innovation in order to response to the new generation of tourists and their constantly evolving motivations. Here lies the importance of innovation networks, nurtured in regions that offer the necessary conditions for innovative processes to occur. Within this context, the regional innovation systems framework provides a model that, if functioning correctly, may improve significantly the tourism destinations' innovation performance and have a significant impact in their development.

Thus, in overall terms, this thesis aims at contributing to the understanding of how regional innovation systems may work in tourism industry and how they can be developed within destinations in order to foster the creation of an environment supportive and conducive to successful innovations and sustainable development.

1.3 Overview of methodology and objectives

The general objective of this thesis is to analyse how regional tourism innovation systems influence innovation performance of tourism destinations and if they have an impact on their development and competitiveness. Under this broad approach, some specific objectives are defined that allow assessing key dimensions that contribute to clarify the research problem. These are:

- To characterise the patterns of tourism innovation at destination level, in terms of performance, type, activities and sources of innovation;
- To evaluate the characteristics of the relationships established within regional tourism innovation systems that are on the basis of destination level innovation across regions;

- To evaluate the characteristics of the structure and of the relationships established among tourism institutions within regional tourism innovation systems that are on the basis of destination level innovation;
- To determine the importance of the region and of regional specific factors for tourism innovation;
- To determine the importance of localised knowledge for tourism destinations' innovation;
- To evaluate how regional tourism innovation systems influence destination level innovation as tourism destinations evolve.

The study of innovation systems is a complex task, as the model involves several dimensions. Many studies focus on only one dimension or conduct the analysis based on secondary data, mainly from Community Innovation Survey, Innovation Union Scoreboard or Regional Innovation Scoreboard. However, these data does not fit in the objectives of this research, as well as it provides mainly information at NUT II level.

Therefore, it was chosen to engage in two different empirical studies that complement each other and, together, allow fulfilling the objectives and testing the defined hypothesis. The first study was directed to tourism firms located in Douro and Aveiro and aimed at understanding: (i) the innovation performance of tourism firms; (ii) their networking patterns towards the development of innovation; (iii) the importance of regional specific factors for tourism innovation; (iv) the role of regional knowledge and related processes; and (v) the perception of tourism firms regarding regional innovation environment and the influence of innovation within the development of tourism destinations. This provided data that was analysed through descriptive and inductive statistics based on parametric and non-parametric testes (computed in IBM SPSS), which allowed drawing important conclusions on the perspective of tourism firms.

However, while firms may be the main agents of innovation, as they are the ones that develop and commercialise them, the regional environment has a significant part in creating the necessary conditions for firms to engage in innovation processes. Regional institutions are thus fundamental in supporting or even engaging actively in the development of innovation for tourism destinations. Therefore, a second study was launched, and a survey was applied to tourism institutions with focus on tourism or on innovation development. The objective was to submit these data to sociometric methods in order to characterise the networking patterns of these

organisations. To do so, the UCINET and NETDRAW software for social network analysis were used. Strong networks make institutional thickness emerge and create synergies that are transferred to the territory (externalities), such as, for instance, knowledge spillovers. The combination of both methods provided useful insights into the functioning of regional tourism innovation systems. The adopted methodology is discussed in detail in chapter 5.

1.4 Structure of the thesis

The thesis is divided in three parts. The first part is composed by three chapters including the literature review and provides the theoretical framework of the research by focusing on the development of tourism destinations, innovation and the regional innovation systems model. The second part includes four chapters and presents the methodological options and the adopted research process, followed by the empirical analysis and the subsequent validation of the hypothesis. The last part presents the main findings, the conclusions and implications of the research.

In chapter 2, an analysis is made on the concept of development, introducing some initial approaches on the role that innovation plays on the evolution of societies and economic systems. This is followed by an in-depth review of the main models of tourism development, which allowed concluding on the relevance of the Tourism Area Life Cycle model (Butler, 1980) as the most comprehensive and widely used. This approach assumes that tourism destinations, at some stage, inevitably enter in decline in terms of number of tourists and in their physical setting. This insight, alongside some criticisms that postulate that different regions may follow different paths of development, laid the ground for the analysis of the role that innovation plays in the evolution of tourism destinations.

Thus, it is fundamental to understand what innovation is, how the practice of innovation developed in the last decades and what are the most recent theories and models. This is achieved on chapter 3. Subsequent to these initial topics, innovation in tourism is then analysed. It is found that research on this matter is lacking, both at conceptual and empirical levels. Despite this, the phenomenon is characterised, as well as a review is made on the determinants and barriers that

tourism firms face when innovating. Services in general and tourism in particular are often seen and non-innovative economic activities. While trying to assess the validity of this assumption, the characteristics of innovation in services are overlooked, and data from the Community Innovation Survey is analysed in order to establish a comparison between the patterns of innovation in service and manufacturing firms. This chapter also introduces the importance of economic agglomerations for economic growth, innovation and competitiveness of regions, namely by analysing the externalities created by firms' clusters, which unveils the relevance of innovation processes developed in cooperation and linked to the territories. To conclude this line of though, a thorough review of the different schools of thought regarding territorial innovation models is presented.

Chapter 4 is entirely dedicated to the analysis of regional innovation systems. The several dimensions of this model, which is considered to be the most adequate approach to tourism industry, are studied in detail, namely its components, functions, the networks as the mechanisms that underlie its functioning, the boundaries of innovation systems within tourism regions and the role of knowledge in contributing to the increase of innovation performance. This allowed developing a framework for the application of regional innovation systems to tourism and provided a significant contribution for the design of the empirical study.

In chapter 5, a discussion is made on the adopted research process. It starts by presenting some considerations on the epistemology of scientific method, aiming to frame this thesis within the positivist paradigm and thus justifying the selected methods. Subsequently, it describes the theoretical framework, namely the research question, the objectives and the related hypothesis. The used methods and techniques are also discussed in detail by presenting process of the surveys design, the criteria applied to the selection of the regions under study as well the definition of population of tourism firms and institutions. It ends by explaining the data collection process and data analysis procedures.

As mentioned, two different empirical studies were conducted in order to fulfil the research objectives. The empirical results and analyses are discussed in detail in chapters 6 and 7. Chapter 6 focuses on the analysis of the surveys applied to tourism firms from the regions of Douro and Aveiro. Its main objective is to characterise the innovation patterns and processes developed by these organisations. In chapter 7, social network analysis methods are employed in order to

analyse the network of institutions in both regions, in the perspective of how they engage in or support regional innovation in tourism, by providing the basis for a well functioning regional tourism innovation system.

The validation of the hypotheses is made in chapter 8. The decision to include the hypotheses testing in a separate chapter results from the fact that, in order to validate them, the researcher had to combine results from both empirical studies. It was considered that this way, a more objective analysis could be made, facilitating the understanding of the process by the reader.

Finally, chapter 9 highlights the main findings and conclusions of the study and advances the thesis contribution, both at academic and management levels. It ends by discussing the limitations of the research and providing some suggestions for future research on this topic.

Chapter

2

Development of tourism destinations

2.1 Introduction

Innovation is one of the most important engines of regional growth, development and competitiveness. This thesis focuses on how regional innovation can influence the development of tourism destinations. Bearing this in mind, this chapter aims at analysing the topic of development, in a broader context, by reviewing the main concepts and theories, and the development of tourism destinations, and by presenting the models that frame the evolution of tourism territories. The main objective is to establish a context that allows understanding these dynamics in order to subsequently analyse the role that innovation may play within regional tourism development. In order to study territorial innovation, it is crucial to discuss how different theories of spatial evolution and development of tourism destinations may influence the tourism development process. It should be noted that a single innovation introduced by the supply side may significantly impact on the development of the entire tourism destination.

Several changes occurring in society, markets and global economy led to the reducing of product life cycles in terms of the time span over which they develop. Consequently, organisations have to innovate in terms of products and services that are offered if they want to remain competitive (Evans, Campbell, & Stonehouse, 2003). Tourism businesses and organisations play by the same rule. New trends in demographics, life styles, consumption patterns, purchasing power, new technologies and access to information, among other changes brought new trends for tourism management and development (Buhalis & Costa, 2006a, b) and have, over the last decades, influenced the shortening of tourism destinations life cycle. This demands for the development of new products and, even more important, new travel experiences that must be introduced throughout all stages of tourism area life cycle (Butler, 1980), so that the destination may permanently reinvent itself. In manufacturing, the introduction of an innovation in the form of a new product or process has important consequences, but that happens mostly to the firm itself. In what regards tourism, the introduction of a new product often has an impact on the image of the whole destination and influences the global tourism experience. This is one of the reasons why the development of tourism innovation networks within tourism territories as being particularly important.

This chapter begins by analysing the overall concept of development (section 2.2) and the development of tourism destinations (section 2.3) focusing on the main theories and models

explaining these processes (section 2.3.1). It is found that Butler's Tourism Area Life Cycle (Butler, 1980) remains the most comprehensive and used approach, and thus a detailed review of this model is included on section 2.3.2, as well as its main limitations (section 2.3.2.1) which, in some cases, provide significant insights on alternative development paths for tourism territories. Despite the lack of conceptual studies and empirical evidence on this matter, the role of innovation in the evolution of tourism destinations is briefly revised in section 2.3.3, laying the grounds for a deeper analysis, conducted in the following chapters.

2.2 The meaning of development

The concept of "development" is a rather ambiguous one, subject to different interpretations depending on the perspective taken. According to Goulet (1968, cit in Pearce, 1989), development can be seen both as a process of social change, and a state or condition whenever a society is considered to be developed or underdeveloped.

Traditionally, development was understood in a strictly economic perspective, measured in terms of economic growth, namely through the increase and sustenance of Gross Domestic Product or, in alternative, the growth of the income *per capita* which allowed analysing the ability of a country to enlarge its outputs at a rate faster than the population growth rate. Another related issue was the reducing of the structure of production and employment in agriculture, transferring them into manufactures and services, as a result of rapid industrialisation as a development strategy (Todaro & Smith, 2008). Due to the fact that the concepts of growth and development demonstrate a strong connection, the distinction between the two is hardly easy. Therefore, many of the development theories and models were first connected to the economic growth theories.

Development implies change and is tied to the process of economic and social transformation of societies. Economic growth is a pre-condition for development. However, development implies more than the increase in national income. It must be a sustained rise of GDP alongside the necessary changes in societies' attitudes and traditions that, in the past, may have prevented society from progressing, and must integrate a broader concept of human welfare embracing

social, political and cultural goals, implications and values (Ingham, 1995; Seers, 1969; Thirlwall, 1989). In order to the process of development to happen, the economic growth must always be accompanied by a long-term and irreversible structural change (Coffey & Polése, 1985). According to Thirlwall, Goulet's definition seems to be the best attempt to do so, as it discriminates three main interrelated components: life-sustenance, self-esteem and freedom. The first is related with the provision of basic needs, while self-esteem concerns with the improvement of standard of living (higher incomes, education, employment, cultural and humanistic values), and freedom *"(…) refers to freedom from the three evils of 'want, ignorance and squalor' so that people are more able to determine their own destiny"* so that societies and countries are not dependent on others (Goulet, 1971, cit in Thirlwall, 1989, p. 8). In this perspective, development must be understood as:

> *"(…) a multidimensional process involving major changes in social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, and the eradication of poverty. Development, in its sense, must represent the whole gamut of change by which an entire social system, tuned to the diverse basic needs and desires of individuals and social groups within that system, moves away from a condition of life widely perceived as unsatisfactory toward a situation and or condition of life regarded as materially and spiritually better"* (Todaro & Smith, 2008, p. 16).

The term development has been used with many different meanings. Mabogunje (1980) identified four main dimensions of application of the concept and introduced a fifth definition, as summarised in table 2.1.

Over the last decades, the increasing awareness of the environmental problems moved the concept further in order to include and debate the issue of sustainability. Concerning about the deterioration of environment and natural resources and its consequences for economic and social development, the *Brundtland Report*, launched the most cited definition of sustainable development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (World Commission on Environment and Development [WCED], 1987, p. 43). Nonetheless, sustainable development does not focus exclusively on environmental issues. The United Nations' 2005 World Summit acknowledges that the concept encompasses three "*interdependent and mutually reinforcing pillars*": economic development, social development and environmental protection (United Nations [UN], 2005).

Table 2.1 – Applications of the concept of development

Development as…	Meaning
Economic growth	After Second World War, development meant economic growth, focusing on the increasing of production outputs, rather than on people involved in producing it.
Modernisation	Although still related to economic growth, development included a social dimension related to modernisation. Here, the emphasis was on the process of developing individuals based on education (a critical aspect of social change). However, modernisation also incorporated the notion of consumption of goods and services manufactured in advanced industrial countries.
Distributive justice	Development incorporates a strong social dimension, namely the reducing of poverty, social justice, nature of goods and services provided to populations, accessibility of public goods to all social classes, how the externalities of development can be shared among the classes. The concern is not only who benefits, but also who pays for development. During this period (1960's), regional development planning emerges as strategy for distributive justice.
Socio-economic transformation	The issues related to distribution and social justice cannot be resolved independently of mechanisms governing production and distribution. The shifts in any of the aspects of production can trigger modifications which may culminate in changes in the relative importance of social classes. This socio-economic transformation constitutes development. This interpretation highlights the relationships between development and underdevelopment, with metropolitan centres enriching at the cost of underdeveloped peripheral regions.
Spatial reorganisation	Spatial forms represent physical realisations of patterns of social relations; therefore, spatial reorganisation is understood as a synonymous of development. The need for a pattern of social relations which can introduce new production processes requires the reconstruction of spatial structures of a country. Certain types of spatial arrangement can better contribute to the reaching of specific goals than others.

Source: Mabogunje (1980)

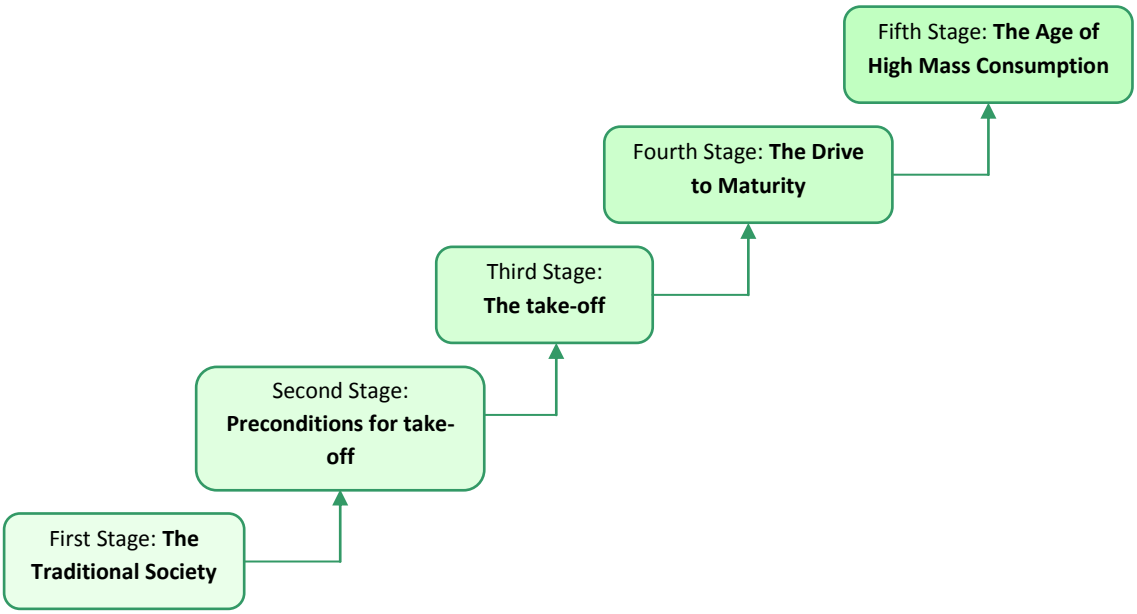
After the Second World War, some development paradigms emerged: *Modernisation*, *Dependency*, *Economic Neoliberalism* and *Alternative Development* (Telfer, 2002). *Modernisation* dominated the period after Second World War and is defined as the socioeconomic development that makes societies evolve from a traditional to a modern framework, embodying a high degree of state intervention. It is seen by some authors as a process of '*westernisation'*, as the structures of developing societies follow the patterns of those of the western countries (Harrison, 1992, cit in Telfer, 2002). The application of modernisation theory to regional development stresses the strategies of transmission or diffusion of growth impulses [see Schumpeter (1934, 1961) and Perroux's (1988) development poles, or *pôles de croissance*, namely their application to geographical space).

Rostow's model (or the *Rostovian Model of Economic Growth*) remains one of the most widely cited development theories, fitting in modernisation paradigm. The economist and political

theorist advocates that economic modernisation and economic growth take place through five sequential stages, each with varying length depending on the country or region (Rostow, 1990).

The first stage of the model, *the traditional society*, refers to a society that has not begun its economic development process yet, embracing what the author calls the 'pre-Newtonian' world, that is, the societies characterized by a pre-scientific understanding of technology, science and general attitudes towards physical world. In result from the fact that the potential of modern science is not available or applied, nor shape a frame of mind, the production outputs are limited. Examples of traditional societies are the dynasties in China, Middle-East and Mediterranean civilizations and Medieval Europe, as well as post-Newtonian societies still untouched by the men's capacity of manipulating external environment in order to gain economic advantages (Rostow, 1990).

Figure 2.1– Rostow's stages of economic development



Source: After Rostow (1990)

The *preconditions for take-off* phase is viewed as a transition stage, where societies prepare themselves or are prepared by external sources of a more developed society for sustained growth. This impact of a more advanced society usually leads to a process of construction of a

modern alternative to the traditional one. During this stage, the idea that economic progress is necessary becomes generalized and is understood as a mean to achieve other purposes, namely national dignity, private profit, general welfare or a better life. An entrepreneurial class arises in private and/or public sector, and banks begin to appear, investment increases, the scope of commerce widens, modern manufactures emerge using the new available methods. However, this develops at a limited speed, as the economy and society are *"(…) still mainly characterised by traditional low productivity methods, by the old social structure and values, and by the regionally based political institutions that developed in conjunction with them."* (Rostow, 1990, p. 7). According to Rostow, the building of a centralised national state opposed to the former landed regional interests or colonial power was a decisive and necessary condition for take-off.

During *take-off*, the last resistances to growth are overcome. The forces of economic development are expanded and reach the domination of society, and growth becomes its standard condition. In the more endowed countries, the take-off resulted mainly from the introduction of technological process, however, generally, it derived from the emergence of a social overhead capital, technological development and the existence of a political power that regarded economic modernisation as a serious and essential matter. The rapid expansion of industry stimulated support services and other manufactured goods. The new class of entrepreneurs enlarges and with it, the investment in private sector. New techniques and methods are spread in agriculture and industry, and the resulting changes and way of life are accepted. Society is now driven by economic processes, rather than by traditions, as before (Rostow, 1990).

The period when a society effectively applies the existent scope of modern technology to its resources is called the *drive to maturity*. At this stage, the economy exhibits the capacity to move beyond the original industries responsible for take-off, diversifying itself. *"This is the stage in which an economy demonstrates that it has the technological and entrepreneurial skills to produce not everything, but anything that it chooses to produce."* (Rostow, 1990, p. 10). The investment of national income enlarges and the outputs exceed the increase in population. The economy is now characterized by more refined and technologically more complex processes.

The fifth and final stage is *the age of high mass consumption*. At this point, the society's dominant objective is no longer modern technology. The achievement of maturity lead to a situation where

consumption moves beyond the essential needs due to the increase of income and the structure of working force changes (the proportion of urban population and of people working in offices or skilled factory jobs rises).

According to the author, in order to development and growth to happen, the arrival of an element of modernisation and innovation is mandatory. Only this way the limitations to production disappear. The idea of innovation as a central feature of development and economic growth is strongly related to the Schumpeterian theory of economic development. Schumpeter argues that the starting point of the development process is an economic system in equilibrium or in a stationary state, characterized by the absence of variation or development (although not necessarily of growth) in result of the inexistence of innovation. This economic system is also called *"(…) 'circular flow', running on in channels essentially the same year after year – similar to the circulation of the blood in an animal organism"* (Schumpeter, 1982, p. 61), as it remains a constant recurrence of a cycle always identical to itself. The beginning of development process occurs with the rupture of the circular flow from the production/supply side (and not on the demand side), changing the previous production systems through innovation: *"These spontaneous and discontinuing changes in the channel of the circular flow and these disturbances of the centre of equilibrium appear in the sphere of industrial and commercial life, not in the sphere of the wants of the consumers of final products."* (Schumpeter, 1982, p. 65). In this context, the author emphasises the role played by the entrepreneur, a talented and motivated man, capable of introducing successful innovations in the productive system. These innovators are then followed by other innovators and the previous equilibrium is disrupted.

The author emphasises the relevance of economic cycles, as they are a key condition for development to happen. The period between the moment of introduction of an innovation and the moment in which it begins to produce results varies according to the nature of the innovation itself, leading to the existence of different length cycles. The author quotes three business cycles, or economic waves: the Kondratieff waves (also called supercycles or long waves), lasting from 50 to 60 years, Juglar cycles (from 9 to 10 years) and Kitchin cycles (40 months) (Schumpeter, 1982).

Some criticisms to modernisation theory emerged, namely the unidirectional path of development of modernisation, the assumption that traditional values are incompatible with modernity and the fact that it does not consider alternative or traditional methods of

development (So, 1990; Schmidt, 1989 as cited in Telfer, 2002), which made the **Dependency** paradigm gain prominence during the 1960's and 1970's. The dependency paradigm advocates that developing countries are beset by institutional, political and economic rigidities, both domestic and international, and caught in a dependent relationship with rich countries (Todaro & Smith, 2008).

Economic neoliberalism came forward as a "counterrevolution" against policies of high state intervention postulated by the former theories. Keynesianism and Modernisation theory rejected the market forces, especially concerning the needs of rapid development of developing countries, which should be promoted by the state through investment programs. Its roots lay on the work of Adam Smith and David Ricardo's theory of comparative advantage, both defending a minimalistic approach to state involvement in economy, emphasising supply-side factors and favouring free competitive markets, private investments, market-led growth and outward development. Neoliberalism theory rejects policies based on demand stimulation, import substitution, state intervention and centralised development planning (Brohman, 1996).

More recently, the *alternative development* paradigm arose due to the dissatisfaction with the existent development models focused on economic growth and top-down diffusion of growth impulses. It addresses the need for increased local involvement and participation in the development process, linked to the concept of local control over decision-making (Brohman, 1996; Pretty, 1994, cit in Telfer, 2002). Moreover, former paradigms did not incorporate environment into development and, along with increased environmental awareness, the concept of sustainability includes the participation and involvement of local communities in development. Development policies must start to operate under the paradigm of sustainability.

The term *development* has several applications and the concept leads to different interpretations as well. It implies economic growth, but is by far a much broader conception, embracing social, economic, and even environmental issues that cannot be discarded. It is either a process or a state, considering that the way that the process occurs will result in a different state or condition, namely developed or under/less developed country or region. In order to trigger the development process, some conditions or situations must be assured: the existence of structural change and modernisation in a traditional or less developed society (Rostow, 1990) and the introduction of innovation in the economic cycles (Schumpeter, 1982).

However, nowadays, the paradigm has changed and new economic and development models incorporate other dimensions as critical elements in order to societies maintain their development processes. The emergence of *knowledge society* fetches information and knowledge as central production factors (Drucker, 1993, 1998, 1999):

> *"(…) knowledge is the primary resource for individuals and for the economy overall. Land, labour, and capital – the economist's traditional factors of production – do not disappear, but they become secondary. (…) the purpose and function of every organization, business and non-business alike, is the integration of specialized knowledge into a common task."* (Drucker, 1998, p. 113).

This way, societies and economies ought to build a model of development that brings alongside the introduction of **innovation** processes, **knowledge** as a central production factor and the necessary structural (organisational) shifts conducting to leadership and **governance** structures capable of understanding the evolution of development paradigm, as well as to implement the necessary strategies and responses that lead to a sustainable and adequate development of countries and regions. In this context, governance should be understood as "*(…) the manner in which power is exercised in the management of a country's economic and social resources for development. (…) good governance is central to creating and sustaining an environment which fosters strong and equitable development.*" (World Bank, 1992, p. 1). These issues are further developed in the following chapters.

2.3 The development of tourism destinations

The previous section surveyed different approaches to the concept of development. The main purpose is to establish an overall framework in which the evolution of tourism destinations may be studied. Development can assume several and distinct dimensions and perspectives, namely economic, social, environmental, sustainable, growth, etc. A major conclusion relates to the insights of Schumpeter (1982) and Rostow (1990), who argue that there development is hardly achieved without the introduction of innovation in societies and/or in the economic system.

The objective of the following section is to move further trying to explain how the concept of development may be placed in an enlarged discussion concerning the evolution of tourism territories in their physical, social and economic dimensions.

2.3.1 Evolutionary theories and models: the development of tourism territories

As seen before, development can be understood as a state or a process. The development of tourism can also adopt this dualism. When considering tourism development as a process, the focus is on the way tourism develops or evolves, being the term (*narrowly*) defined as *"(…) the provision or enhancement of facilities and services to meet the needs of tourists"* (Pearce, 1989, p. 15).

Under the four development paradigms considered by Telfer (2002), the author analyses their application to tourism development according to their major influences and their positive and negative features.

Under modernisation theory, tourism is considered as a development strategy for countries and/or regions, fosters the transfer of technology, increases employment and GDP, generates foreign exchange, attracts development capital and promotes a modern way of live, transforming traditional societies (Mathieson & Wall, 1982; Harrison, 1992 cit in Telfer, 2002). In accordance with this paradigm, governments increased the attention gave to tourism during the 1960's namely in economic development plans and trade agreements. Several tourism development models emerged under modernisation theory, according to stages or diffusion theoretical approaches: Van Doorn (cit in Pearce, 1989) argues that tourism development can only be analysed and understood when considering the context of the global development stage of the country and matches the stages of tourism development with social and economic development; Krapf (1961) considered tourism economic growth under Rostow's model approach; Plog (1972, 1974) and Cohen (1972) defined tourists' personality types and linked them to destinations' development stages; Miossec (1976) refers to the time and space structural evolution of destinations, Thurot (1973) and Nash (1979) analysed destinations' evolution according to social class succession, Burton provides a stage-based framework of tourism development, both

spatially and over time and refers to the economic situation of generating areas, Butler's tourism area life cycle model (1980) characterises the rise, growth and decline stages of destinations development; and Keller (1984) adapted TALC model, including the increasing levels of international control as the numbers of tourists rise. These and other approaches and models are further examined in this work.

The agents and stakeholders of tourism development are from both private and public sector. Therefore, in countries where private sector is weak (usually the case of developing countries), the state may intervene as entrepreneur in order to attract investment and create the appropriate conditions to stimulate economic growth (Jenkins, 1980 cit in Telfer, 2002).

This does not mean that government should be left aside of tourism development in developed countries or in locations where private sector is solid and strong. Public sector must regulate tourism development (infrastructure, environment) and also boost investment (either domestic or foreign). As argued by Weaver (2000), if there is public intervention, higher levels of local control and increased regulation, alongside with local community participation, it is more likely that a destination achieves a scenario of sustainable tourism development, which, combined with appropriate planning and strategy, will eventually avoid the stage of decline that many destinations go through.

When analysing tourism development under dependency theory, one may conclude that the predominance of foreign ownerships in developing countries leads to the emergence of core-periphery relationships, preventing destinations from benefiting directly from tourism (Telfer, 2002). Turner and Ash (1975, cit in Pearce, 1987) refer specifically to tourism destinations as a "pleasure periphery", materialized in a tourist belt that surrounds the main industrialized areas of the world.

This type of core-periphery relations that imply unequal power distribution and multinational corporations that dominate tourism industry in developing countries lead to the underdevelopment of Third World societies. These multinational First World companies control airlines, tour wholesaling and major hotel chains, which gives them the ability to create, coordinate and market the components of tourism industry in order to develop tourist products. This control from foreign capitalist firms is perpetuated through commercial practices including

control over tourism technology, industry expertise, product design and pricing and economies of scale (Britton, 1982 cit in Telfer, 2002). Therefore, supply and demand are controlled almost entirely by these large-scale corporations, which will determine the type, size and path of tourism development, in every dimension related to it, namely the number and types of tourists, number and types of tourism infrastructures and tourism economic linkages and leakages.

In a paper entitled "*Peripheral Area Tourism: A European Perspective*" Wahnill (1997), recognises that these areas have " *(…) limited organisational structures, lack of planning direction and little statistical information"* and argues that SME's, being dominant structures of tourism industry, must be co-partners in the implementation of any development strategy.

Several other authors approached and studied the issues of core-periphery relationships and peripheral destinations development in tourism (Buhalis, 1999; Christaller, 1963; Gormsen, 1981; Harrison, 1995; Husbands, 1981; Keller, 1984, 1987; Lundgren, 1983; Papatheodorou, 2004).

Economic neoliberalism paradigm's important aspects to tourism development analysis include the emphasis on competitive exports and the use of SALPs (Structural Adjustment Lending Programs), a funding provided by international agencies in order to develop tourism plans and infrastructures (in European Union these structural funds were materialized through LEADER program). These funds reduced the influence of state system and highlighted the strategic importance of private sector in tourism development. However, government still has important functions as an enabler of tourism development rather than operational (Telfer, 2002). Innovation is, under this paradigm, highly limited by the existence or absence of funds.

The influences of the four development paradigms are not mutually exclusive, as each has positive and negative attributes. Telfer's framework on appropriate tourism development comprises positive impacts of each development theory. Some considerations must be taken into account when planning tourism development:

- **i.** Tourism development must consider site and situation specificities;
- **ii.** Stakeholders must be consulted and agree with desired tourism development;
- **iii.** Tourism development has to be planned in relation to broader economy, overall goal of sustainable development and human and physical environments;

iv. Tourism development should address: the role of government; ownership and control; international vs. domestic tourism; scale of tourism development; integrated vs. enclave tourism.

There are several models resulting from different approaches to tourism development. According to Pearce (1987), they can be classified under four categories: tourist travel (focusing on the travel or linkage component); origin-destination models; structural models; and evolutionary models. The later stress the change and evolution of tourist destinations, weather considering the evolution of tourist movements or the development of tourist structures.

The analysis of tourism development is often undertaken under a geographical perspective. The analysis of the geographical development of tourism should be composed by six main topics, namely: spatial patterns of supply, spatial patterns of demand, geography of resorts, analysis of tourist movements and flows, tourism impacts and models of tourist space (Pearce, 1979).

Table 2.2 – The interrelationship of development process stage models and the resort life cycle

<table>
<tr><th colspan="2">Economic Development Stage Models</th><th colspan="2">Resort Life Cycle</th><th colspan="4">Tourism Space Development Model</th><th rowspan="2">Host Response Cycle (Doxey)</th></tr>
<tr><th>General (Rostow)</th><th>Tourism-related (Keller)</th><th>Butler model</th><th>Modified</th><th>Resorts</th><th>Transport</th><th>Tourist Behaviour</th><th>Destination Reaction</th></tr>
<tr><td>Pre-conditions for take-off</td><td>Local control</td><td>Exploration</td><td rowspan="2">Discovery</td><td>Traversed or inaccessible</td><td>Transit or isolation</td><td>No interest or knowledge</td><td>Mirage or Refusal</td><td rowspan="2">Euphoria</td></tr>
<tr><td>Take-off</td><td>Regional involvement</td><td>Involvement</td><td>Pioneer</td><td>Opening up</td><td>Global perception</td><td>Observation</td></tr>
<tr><td>Drive to maturity</td><td>National control</td><td>Development</td><td>Growth</td><td>Multiplication</td><td>Links between resorts</td><td>Perception of places</td><td>Infrastructure policy</td><td>Apathy</td></tr>
<tr><td rowspan="3">Age of high mass consumption</td><td rowspan="3">International control</td><td>Consolidation</td><td rowspan="3">Maturity</td><td>Initial hierarchy & specialization</td><td>Excursion circuits</td><td>Differentiation</td><td>Demonstration effect Dualism</td><td>Irritation</td></tr>
<tr><td>Stagnation</td><td>Full hierarchy & specialization</td><td>Maximum connectivity</td><td>Spatial competition & segregation</td><td>Total Tourism</td><td rowspan="2">Antagonism</td></tr>
<tr><td></td><td></td><td>Saturation</td><td></td><td rowspan="2">Substitution</td><td rowspan="2"></td></tr>
<tr><td></td><td>Local involvement</td><td>Decline</td><td>Decline</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(Rejuvenation)</td><td>(Rejuvenation)</td><td></td><td></td><td></td><td>Community tourism</td><td></td></tr>
</table>

Source: Adapted from Gordon and Goodall (1992, p. 46)

The assumption that tourism destinations are dynamic, evolving constantly through time has existed for many years. Early publications on the topic of resort development and change,

although subjective, with no empirical evidence, and based on observation and common sense, are dated from the early 1880's and came out as editorials and letters-to-the-editor on the pages of *The Nation* (Butler, 2006), a politically influential weekly magazine edited by Edward Lawrence Godkin. Those were later published in a book entitled *Reflections and Comments 1865-1895*, including some unveiling quotations regarding the resorts development process:

> *"The growth of American watering-place (…) seems to be as much regulated by law as the growth of asparagus and strawberries, and is almost as easy to foretell. The place is usually discovered by artists in search for sketches, or by a family of small means in search of pure air. (…) Its development now begins by some neighbouring farmer's agreeing to take them to board – a thing he has never done before. (…) In the next stage he seeks them and is emboldened by the advice of somebody to advertise the place. (…) his house is now frequented by intellectual or 'cultured' people; and he becomes more enterprising, enlarges the dinning-room, adds on a wing, relieves his wife of the cooking by hiring a woman in the nearest town (…) little by little, he grows into a hotel-keeper. His neighbours, startled by his success, follow his example, and soon the place becomes a regular 'resort'. This stage may last thirty or forty years without any change, beyond the opening of new hotels – and it becomes marked by crowds of people (…) and is now being brought to a close in scores of American watering-places, by the appearance of the cottager, who has become (…) a ruthless invader and exterminator. (He) buys a lot with a fine view. The next year, he builds a cottage on it and separates himself from his fellow-boarders. The change has come. The community, once so simple and homogeneous, is now divided in two classes. More cottages are built (…) and the original farmer has probably by this time sold enough land to cottagers to enable him to give up taking boarders and keeping a hotel. (…) Very soon the boarder, unable to put up with the haughtiness of the cottager, and with exclusion from his entertainments, withdraws silently from the scenes he once enjoyed so much, to seek other unsophisticated farmer, and begin once more the heavy work of opening up another watering-place and developing its resources. The little houses of the original half-farmers, half fisherman who welcomed, or rather did not welcome, the first explorers, grew rapidly into little boarding houses, then into big boarding-houses, then into hotels with registers. Then the hotels grew larger and larger, and the callings of the steamer more frequent, until the place became famous and crowded.* (Godkin, 2004, pp. 123-125)

The earliest scientific publications on resort development dealt with traditional seaside towns, particularly in England, and are still widely quoted in current studies. The works of Ogilvie (1933),

Pimlott (1947), Gilbert (1939, 1949, 1954), House (1954) and Barrett (1958), provided the related research with valuable contributions on the destination development and evolution topic.

Many different authors approach the topic of tourism destination development from distinct perspectives, each dealing with a part of the whole complex tourism system (Pearce, 1987). Thurot (1973) and Nash (1979) studied the evolution of resorts from the demand side, namely the perspective of social class succession. According to the authors, as the resort evolves, the classes of tourists arriving change successively from elites (or upper classes) to the middle class mass tourists. While studying the development of international tourism of Caribbean destinations, Thurot (1973) observed the existence of three phases. Phase one is characterised by the discovery of the destination by rich tourists, leading to the construction of an international class hotel. In the second stage, the "upper middle class", hotels start to be developed and tourist traffic expands, followed by the loss of the original attractiveness and value to other new destinations alongside the arrival of the middle class and mass tourism (third and final phase).

Although analysing a different and far destination, both in space and time, Nash's (1979) findings on Nice's tourism development are very similar to Thurot's. The change in classes of arriving tourists demonstrated an evolutionary trend resulting mostly from outside entrepreneurial activities. The first stage of development, entitled "early growth" ranges from 1763 to 1860 and is characterised by the arrival of English elites and aristocrats that spent part or all of the winter season, searching for a pleasant winter climate, hospitality, reasonable costs and interesting countryside. The lodging was mainly in *auberges* and rented rooms along the shore and later, on rented or owned apartments or villas.

During "maturity" stage (1860 – 1914), a series of events lead to a significant increase in Nice's tourism activities, namely, the visits from the Russian royal family, acting as an attractor for Russian elites, the annexation of Nice by France and the railroad, built in 1864, which made the trips from North cheaper and easier. From 1860 to 1880, the number of winter visitors grew from 8.000 to 42.000 a year. Tourism development was heavily dependent on outside initiative, namely by the English colony that undertook several tourism-related projects. This period saw a great increase in tourism entrepreneurship, as hotels grew in number, as well as public works such as sewers, gardens and streets. Slowly, the government intervention also increased, supporting and

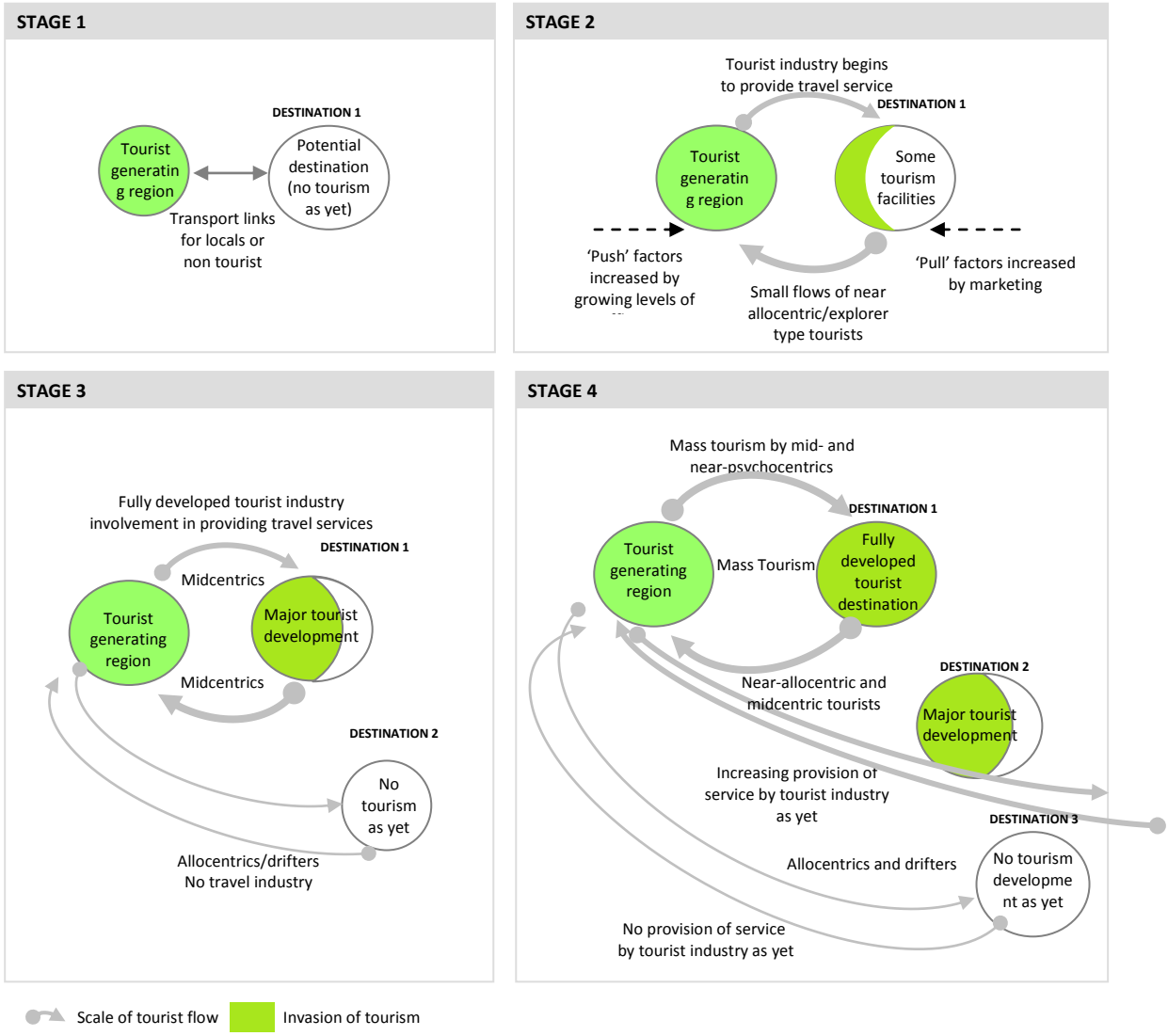
funding tourism development. Winter tourism reached its peak immediately before the turn of twentieth century (Nash, 1979).

Before the Great War, Nice maintained its position as a flourishing tourist centre. However, tourism ended when the place was transformed into a convalescent centre during the war. A large part of the aristocratic winter tourists disappeared during this time. Nash called this period the "transformation" stage, lasting from 1914 to 1936. After the war, tourist flows were revived, resulting from the prosperity that followed. Nonetheless, the tourists were no longer the former aristocrats and elites, as new social classes were now able to afford vacations in French Riviera. Alongside, the acquired right to paid vacations from 1936 on marked the end of Nice as an aristocratic destination, transforming it definitely into a mass tourism destination (Nash, 1979).

Other authors postulated evolutionary theories approaching the development of resorts from the demand side, regarding the succession of tourists groups characterised by different profiles and motivations that respond to the changes in the physical character of destinations. Christaller (1963) unveiled some early considerations on this matter, followed by Plog (1972, 1974, 2001) and Cohen (1972) that suggested some of the most popular theories on this matter. Once their findings seem to have contributed more directly to the creation of Butler's tourism area life cycle, they are approached in detail in section 1.3.3.

According to Burton, the spatial development pattern of tourism regions depends on three essential factors: tourists' motivations, industry's motivations and host community's motivations. That is, it will depend on *"the coincidence between the sorts of places that the tourist want to go to, the sort of places that the tourist industry can choose to develop and promote and the locations where the host community does not prevent it"* (Burton, 1995, p. 69). The spatial development model created by the author (Figure 2.2) adopts tourists' motivations as a starting point (as defined by Plog and Cohen) and synthesises the findings of other models of tourism development, providing a generalised framework of tourism development, spatially and over time.

Figure 2.2 – Stages of the spatial process of tourist development



Source: Burton (1995)

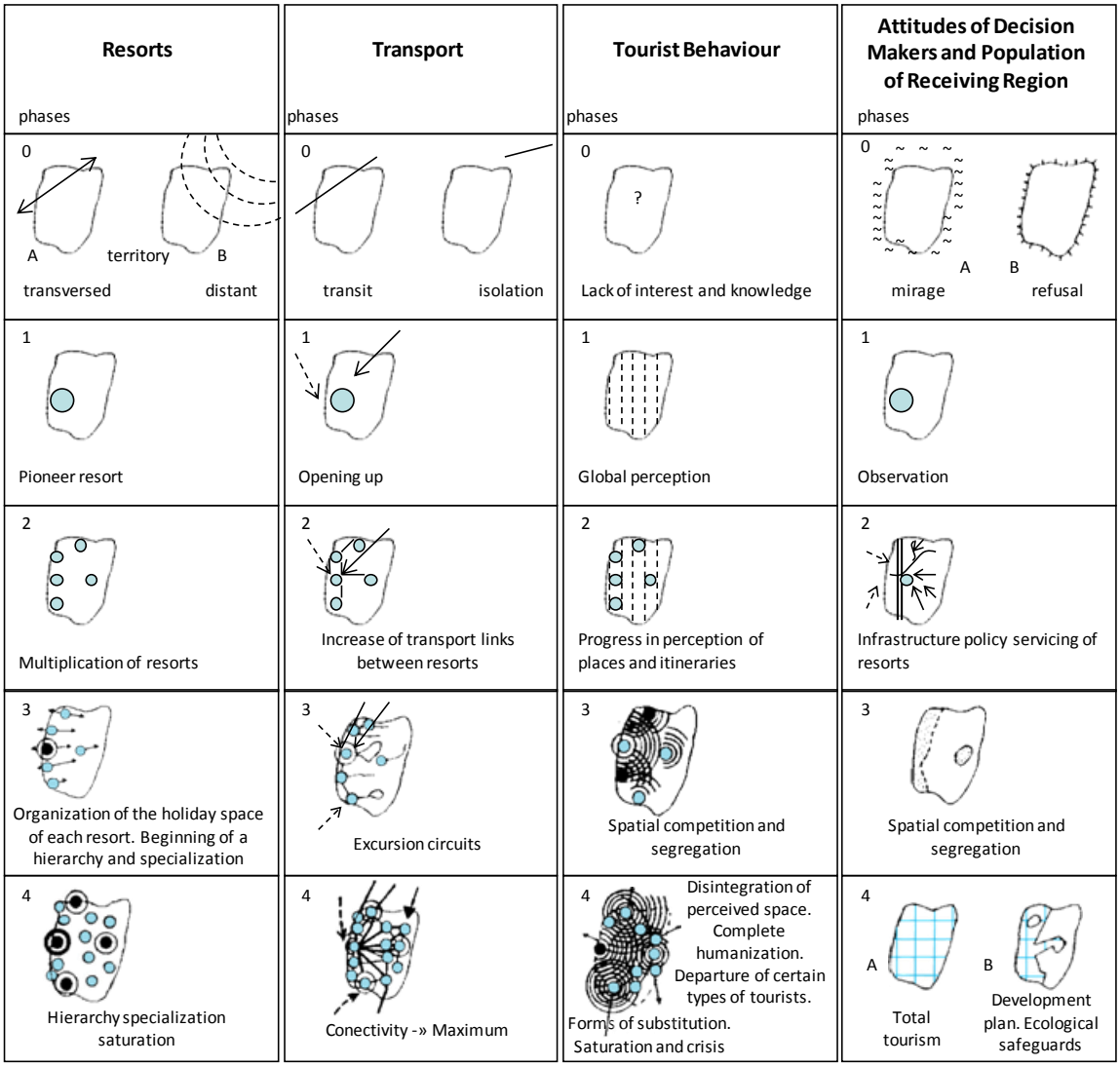
Although the graphic design of Burton's spatial process of tourism development differs significantly from Butler's TALC, the conclusions drawn from it remain much the same. It recognises an evolutionary process of tourism activity and infrastructure development that grows alongside the increasing numbers of visitors. Also similarly to Butler, the author distinguishes a pattern in the succession of types of tourists that arrive to the resort (adopting Cohen's and Plog's theories), as well as the abandon process performed by the first visitors that move to another untouched and original destination, giving place to the beginning of a new cycle.

Nonetheless, an important issue introduced by Burton relates with the economic situation and standard of living in the generating area. If there is continued economic growth, it is likely that the spatial diffusion of tourism will happen even at more distant and different locations. Another important outcome is the progressive change in the type of tourism in each resort; for instance, in the absence of economic growth in the origin area, the situation observed in the first stage is unlikely to show significant changes. On the contrary, if the economic situation improves, the affluence to the resort starts to spread through the population (as observed by Nash in Nice's development: the prosperity period after the Great War made vacations in French Riviera affordable to other social classes), as well as strengthens the motivating 'push' factors (Burton, 1995).

Miossec's model of tourist development (Figure 2.3) integrates aspects related to resorts and transport development, tourist's behaviour and the attitudes of decision makers and host community towards it. According to Pearce (1989, p. 16), this model *"(…) which depicts the structural evolution of tourist regions through time and space, remains the clearest and most explicit conceptualization of the process of tourism development*."

The early stages are characterised by reduced or inexistent development, as the region is isolated or is a transit location. The tourists have no acquired knowledge and interest regarding the destination and host community's attitudes can range from a "mirage" to "refusal". The appearance of a pioneer resort leads to a global perception of the destination and local residents and decisions makers start to observe the initial tourism development. The success of the pioneer resort conducts to further developments, as they begin to multiply. The transport links between resorts increase and tourists recognise places and different possible itineraries; alongside the decision makers intervene in infrastructure policy and provision. Phases three and four demonstrate the organisation of each resort's space and the beginning of a hierarchical and specialisation system between them. Transportation networks evolve, offering several circuits along the region and connectivity inside it reaches its maximum. As a consequence of tourist development, tourists increase awareness of what the region is offering.

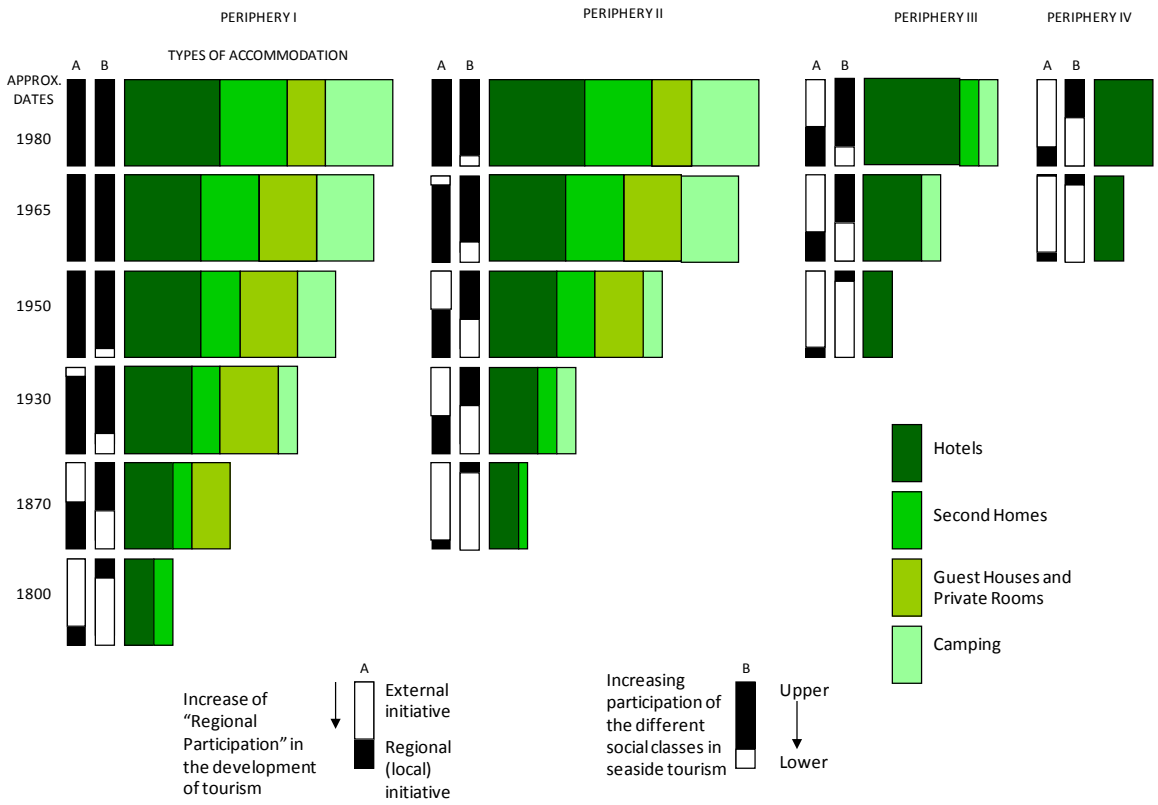
Figure 2.3 – Miossec's model of tourist development



Source: Miossec, 1976, cit in Pearce, 1989

At the same time, a process of spatial competition and segregation arises, leading to the disintegration and humanisation of the space causing the departure of certain types of tourists. The continued development prompts a situation where it is tourism itself, rather than original features, that attract tourists to the area. Some forms of substitution take place, namely mass tourism, leading to saturation and environmental, physical or even economic crisis. Local attitudes can assume the form of rejection (especially resultant from host-guest segregation), total acceptance of tourism or the adoption of development plans (Miossec, 1976).

Figure 2.4 – Spatio-temporal development of international seaside tourism



Source: Gormsen (1981)

The model developed by Gormsen (Figure 2.4) approaches the spatial and temporal evolution of seaside tourism destinations according to the corresponding changes in regional (and/or local) participation in the industry development, in the participation of different social classes in seaside tourism and the quantity and types of available accommodation in the destination (Gormsen, 1981). The author postulates that regional participation tends to increase over time, in detriment of external initiatives usually responsible for the initial tourism development projects (as confirmed by Nash in the study of Nice's tourism development, the initial tourists arriving at the first periphery belong to the bourgeoisie that also invested in luxurious hotels, and upper-class villas became an important input for the development of the second periphery). As the destination evolves, the proportion of middle and lower classes' tourists increases, alongside with the development and growth of accommodation in general, but namely of private rooms, guest houses and camping sites (less expensive lodging).

Based on Caribbean studies, the "self-destruct theory of tourism development" also recognises the cyclical process of tourist resorts' rise and fall (Holder, 1988). The four phases of development and decline are the following:

Table 2.3– Cyclical process of destination's development and decline

1st Phase	Rich tourists arrive at a remote and exotic location in search for rest and relaxation.
2nd Phase	The resort begins to be promoted, attracting tourists of middle classes that search for rest and try to imitate the upper classes. More hotels are built and the resort's original character of 'paradise' is transformed.
3rd Phase	Mass tourism develops leading to physical, social and environmental degradation.
4th Phase	The subsisting social and environmental negative impacts lead to the exit of most tourists, leaving behind neglected and ruined tourism facilities. The host community can no longer return to their original way of life.

Source: After Holder (1988)

Other authors focused on the development of specific types of tourism areas. Young (1983) and Smith (1991) assessed the development patterns of beach destinations, describing it in two stage models that present similar conclusions on land use, numbers and types of tourists, numbers and types of tourism services in general. Both models approach the land use process and relate it to other changes in the tourist system, namely in terms of numbers and types of tourists, relationships between hosts and guests, impacts of tourism development and evolution of resort planning (Burton, 1995). Also De Albuquerque and McElroy (1992) postulated a three stage version of Butler's TALC (*emergence*, *transition to rapid expansion* and *maturity*), in the context of the Caribbean islands. According to Wilkinson (1996), this later model is compatible with TALC, although providing greater detail on tourism impacts, specific types of tourists, seasonality and government involvement.

Ashworth and Tunbridge (1990) approached the evolution of historic urban areas stressing that the "tourist city" emerges at a later stage of city development (stage 4), subsequent to the emergence of the Central Business District and to its relocation into new adjacent parts of the city, separating it from the historic place. The 'tourist city' will then develop in parts of the old city that discover new functions (as a consequence of the introduction of conservation policies and

gentrification processes) and also in the new CBD. These locations include the usual tourist services: shopping, catering, entertainment, cultural attractions and accommodation.

According to Berry (2001), and considering the later stages of destination lifecycle, tourist regions can be classified into three categories: (i) regions of long term stability, (ii) regions that have declined and (iii) regions that have declined and managed to rejuvenate (mainly through the introduction of some innovation. The long term stability regions are those possessing religious or cultural significance, scenic beauty or benefit from the proximity of a major market such as a metropolitan area, and thus decline is unlikely to occur. Heritage or historic cities fit in this category, of which Venice, Rome, Athens and Israel are examples, as well as Niagara Falls and Yellowstone for representing scenic beauty locations that maintain the numbers of visitors along the years.

Burton questions if the development cycle of tourist cities also goes through the process of stagnation and decline and concludes that the multi-functional character of cities and the fact that tourist services are utilised both by residents and different types of tourists (e.g. business, cultural, leisure tourists), prevents their decline. Moreover, the introduction of conservation policies in historic sites usually helps to control the overdevelopment of tourism industry (Burton, 1995). In opposition to this, Russo advocates that heritage destinations can reduce their attractiveness in the later stages of tourism life cycle and decline, resulting from the emergence of what he calls the "false tourists". These are tourists that, in face of high prices and limited capacity of central facilities, choose a near peripheral location for their stay during visitation to the main destination. However, the core still bears the costs of tourism development, despite reducing the share of its benefits. Consequently, entails higher taxes and reduces the budget for conservation and cleaning policies and city marketing. This demands for external sources of income alongside with the imposition of a tourism-oriented valorisation dynamic, damaging less competitive sectors of urban economy that might have the potential to balance the possible decline of tourism (Russo, 2002).

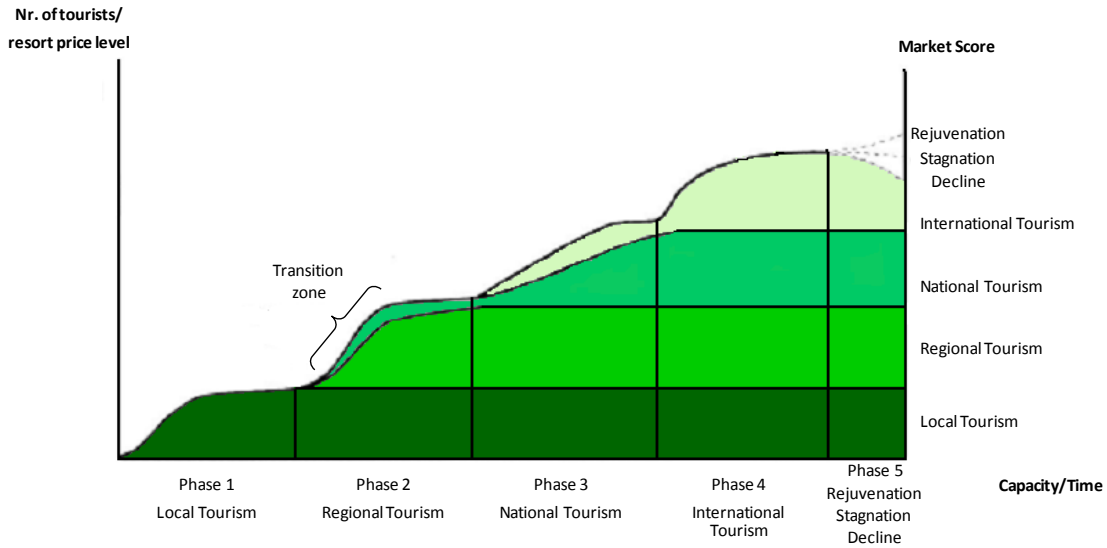
Lundberg's six-phase development scenario also describes the rise, growth and decline of tourism destinations (Lundberg, 1980). However, it has attracted less attention that Butler's model, resulting from its pessimistic view on the recovery of tourist areas. The later stages of Lundberg's model advocate that " *(…) after tourism has begun to decline and structural problems are*

recognized, planners and decision makers will realize that much of the situation is attributable to lack of planning and might take the opportunity to reassess how they are going to deal with the future" (Wilkinson, 1996, p. 20).

More recent approaches to the development of tourism destinations are postulated by Prideaux (2000) and Weaver (2000). Despite of the recognised criticisms and limitations of Butler's TALC, both these approaches find their roots on the widely cited model.

Prideaux's model, entitled the "Resort Development Spectrum", incorporates elements of demand, supply, and capacity and defines five sequential stages of tourism growth: (i) local tourism, (ii) regional tourism, (iii) national tourism, (iv) international tourism and (v) decline/ stagnation/ rejuvenation. Each stage has its market well defined and contained by capacity (measured in terms of supply). To increase its size, the destination has to search for new and more distant markets. The shape of the growth path line will be determined by the time taken in expanding capacity as the destination moves to the following stage (Prideaux, 2000).

Figure 2.5– The resort development spectrum



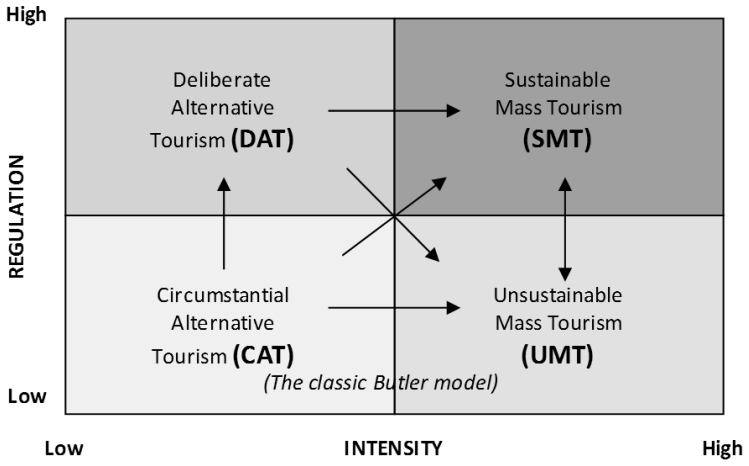
Source: Prideaux (2000, p. 233)

The Resort Development Spectrum Framework analyses the characteristics of five main elements throughout the four stages of destination development. As the model is based on market operation from the supply side, the author addresses the evolution of *principal markets*,

accommodation, *promotion*, *tourism infrastructure* and *transport* during the different stages of development. Although he recognises that local government and community strongly influence the pace and dimension of tourism growth, the framework does not analyse the specific role adopted by these entities in the process of tourism development (the government is briefly referred under the *promotion* topic). The author states that **supply forces shape the conditions that stimulate tourism development**, including private and public sector. Therefore, and considering the significant role that public sector plays on tourism development, the intervention of public entities should be an important part of the construct. Moreover, the emergence of networks, clusters and partnerships are increasing and playing an important and significant role on the process of tourism destinations planning, development and management (Breda, Costa, & Costa, 2005, 2006; Costa, 1996; Costa, Breda, Costa, & Miguéns, 2008), bringing the private sector into the decision making process. Thus, the analysis of private (profit and non profit) entities should not be neglected when studying tourism destinations development. Thus, innovation introduced by the supply side, especially when developed within networks, is of paramount importance in outlining destinations' development.

Adopting a different approach, Weaver's model sets as an alternative to Butlers' TALC, focusing on *intensity* and *regulation* as main variables shaping eight possible transition scenarios between four tourism types. These are based on the relationship between the level of tourism intensity and the amount of regulation of tourism sector.

Figure 2.6– Destination development scenarios



Source: Weaver (2000:219)

Circumstantial alternative tourism (CAT) destinations are characterised by having a non-regulated small-scale tourism sector. They resemble with DAT (d*eliberate alternative tourism*) destinations in accommodation, attractions and economic status, but lack the regulatory environment. When compared to Butler's model, CAT destinations are situated in the exploration or involvement stages. If the regulations exist, one is facing a *deliberate alternative tourism* (DAT) destination. In what concerns to economic status and regulation in these two possible scenarios, tourism complements the already existing economic activities, economic linkages are mainly internal, leakages are minimal and the tourism multiplier effect is high. In what concerns the regulation, which is only present in DAT destinations, the control of tourism development remains in local community, is extensive in order to minimise negative impacts, there is public intervention, the emphasis is put on community stability, well being is assured through integrated and holistic participation and there is a long-term timeframe (Weaver, 2000). When tourism intensity is high, destinations face two different possible scenarios: *unsustainable mass tourism* (UST), where the regulatory function is barely inexistent and, therefore, tourism development exceeds environmental and socio-cultural carrying capacities; and *sustainable mass tourism* (SMT) destinations, where high intensity and large-scale tourism sectors are limited to carrying capacity levels. The evolution from CAT to UMT describes the S-shaped process postulated by Butler (Weaver, 2000).

Both these two recent approaches do not contemplate the post-stagnation stage of mature destinations.

There are several different approaches and models of tourism destination development. Gordon and Goodall advocate that all the existent models are *"(…) descriptive, lacking precision as to the length of time the cycle or any stage takes and remaining vague on the motive forces triggering change and passage between stages*" (Gordon & Goodall, 1992:48). Nonetheless, Butler's Tourism Area Life Cycle provides a useful framework to analyze the evolution of destinations within their complex economic, social and cultural environments (Cooper & Jackson, 1989). Moreover, this model contemplates post-stagnation scenarios, demonstrating that destinations' life cycle can be highly dependent on policy and strategy formulation by decision makers, as well as they can positively respond to the introduction of supply-side innovations in order to rejuvenate the destinations.

2.3.2 Butler's Tourism Area Life-Cycle Model (TALC)

The Tourism Area Life Cycle Model, or the "resort cycle" remains one of the most quoted conceptual frameworks in the tourism literature as it allows a comprehensive understanding of tourism destinations development process.

Theorized by Butler, the concept suggests that tourism destinations are dynamic and evolve through a process of rise, growth and decline modelled by an asymptotic (or S-shaped) curve, depending on factors such as the changes in the preferences and needs of visitors, the deterioration and replacement of physical structures or facilities and the change or even disappearance of the original attractions, responsible for the initial popularity of the place (Butler, 1980).

The Tourism Area Life Cycle (TALC) model finds its roots on many theoretical developments patent in the tourism literature and research mainly of the 1960's and 1970's. Research areas like geography, marketing and territorial planning and development also gave major contribution to the model construct. Butler managed to agglutinate different theories in a construct that is still valid and widely utilized.

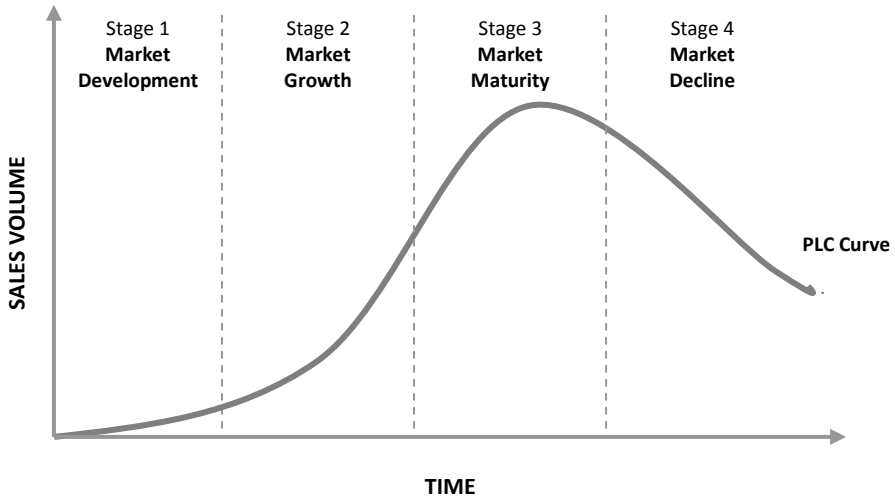
The assumption that destinations are dynamic and are constantly evolving is the main idea on which the model lies on. At the time of the publication of the model (1980), there were a limited number of references on resort development. Previous literature and concepts that provided the major influences to TALC relate with the product life cycle, a theory that, at the time, prompted significant developments in its research and practice, and with the models of wildlife populations behaviour (Butler, 2006). Although in a reduced number, there was a group of research studies that also contributed to a large extent to the way TALC was developed.

The Product Life Cycle (PLC) theory is amongst the most widely quoted and often used models in marketing and management. The concept describes the evolution of products through different stages, following an *S-shaped* pattern of sales, assuming that products have a limited life and different marketing strategies are required at each stage of development. It was first used by Dean (1950) in an attempt to adequate pricing strategies to the products' stages of development.

A few years later, Patton (1959) applied the concept to practice, by building it in a set of four different stages – introduction, growth, maturity and decline, and providing the initial framework for the research that followed. According to the author, there is no average life expectancy in a product life cycle and managers must recognize that there must be a different functional emphasis in the different phases of the life cycle of the product, in order to achieve its success. Therefore, it is essential that the precise phase of the cycle can be recognized, which is a very complex management task.

Inspired by the previous related research, Levitt (1965) developed the Product Life Cycle model according to a set of recognisable stages (Figure 2.7).

Figure 2.7 – The product life cycle

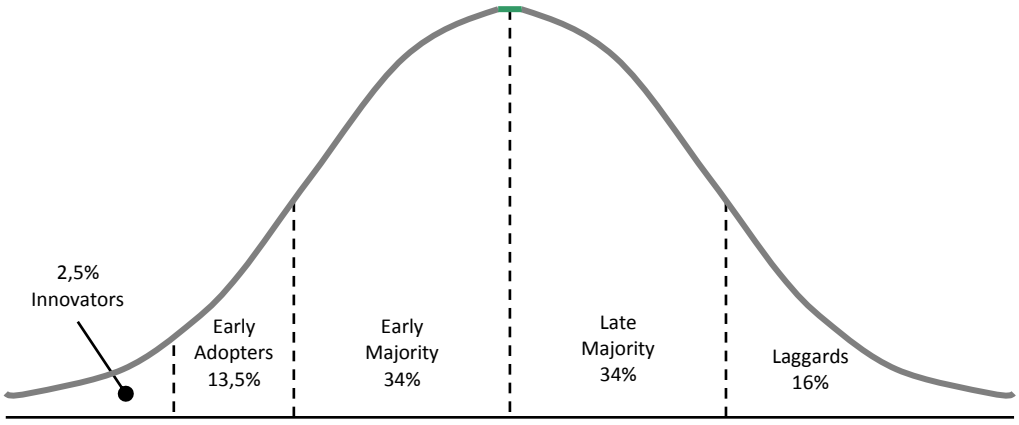


Source: Levitt (1965:82)

The review of related literature unveils that marketing and business strategies should be different across the stages of products' life cycle, as each phase has very distinctive characteristics (Anderson & Zeithaml, 1984; Doyle, 1976; Frohman & Bitondo, 1981; Swan & Rink, 1982). In fact, Hofer argues that "*the most fundamental variable in determining an appropriate strategy is the phase of the product life cycle"* (Hofer, 1975, p. 798).

The underlying assumption of the product life cycle model describes the evolution of the adoption of a new product by consumers. Roger's theory of diffusion and adoption of innovations is strongly related with the PLC theory itself. In fact, it implies that a new product always finds resistance to acceptance and is purchased by a limited segment of the population – the *innovators*. As the product gets known and communicated, a large number of buyers adopt it, causing an increase in sales. As the proportion of adopters gets closer to maximum the growth rate decreases. Eventually most sales represent a repeated purchase. The rate of adoption remains constant during maturity and starts diminishing in the decline phase (Rogers, 2003). Similar to the PLC, this behaviour is also represented by an S-shaped curve, representing the percentage of consumer types that, along time, adopt a specific product (Figure 2.8).

Figure 2.8– Roger's adoption of innovations curve



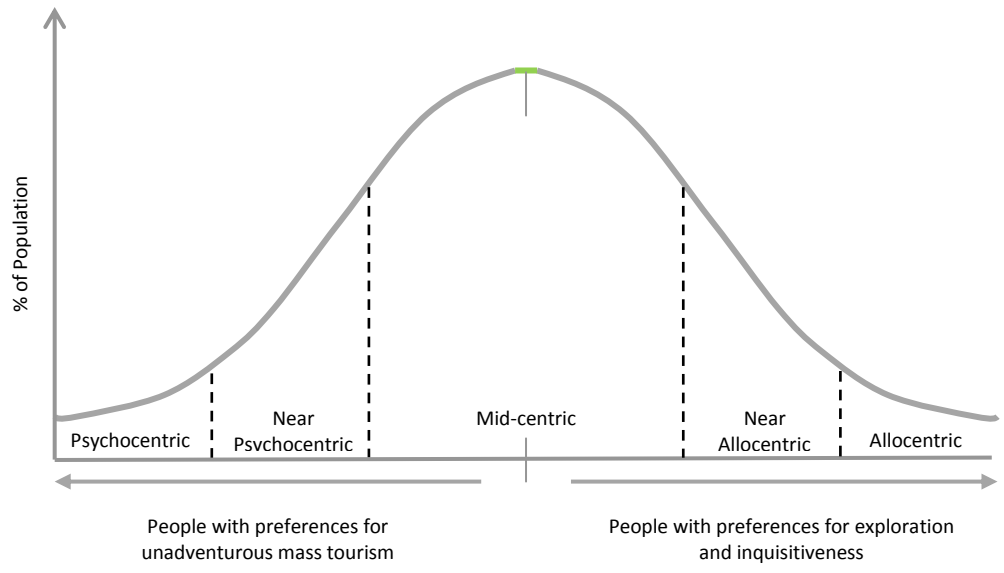
Source: Rogers (2003)

Walter Christaller, a German economic geographer, was one of the first authors to approach the resort cycle. At the time of his writings, he suggested that painters are the first to discover future resorts in untouched places, while they search them to paint and to create. Slowly, these locations become artists' colonies, as they are searched by other artists and celebrities (like poets, cinema people and gourmets) and the place becomes fashionable. Although in an early stage, this initial tourist development leads to the gradual adaptation of local facilities to tourist purposes. The first hotels are built, more people arrive, the resort starts to be advertised and travel agencies start to launch the first tourist packages. Alongside, visitors that initially searched for original recreation and authenticity leave to other peripheral regions. Gradually, the place fades of and

moves out of fashion, and tourists also leave and move elsewhere. In other places, the cycle happens again (Christaller, 1963). Although subjective, the approach made by Christaller to the resort cycle states the idea of dynamism of tourism destinations and brings to the discussion the process of change in the types of tourists that arrive at a particular destination as it evolves and develops, setting the basic idea for the TALC model construction.

The theory related with changing tourist types was later developed by Plog (1972, 1974) and Cohen (1972), both providing important inputs to Butler's model. Based on a psychographic system, Plog argued that tourism destinations appeal to a specific type of tourists and follow a predictable pattern of growth and decline in popularity and, consequently, in numbers of visitors over time. This results from the fact that the character of destinations change with the development and growth of tourist facilities and the appeal developed in the initial market segment (and the reason for popularity) does no longer exist and the destination begins appealing instead, over time, to narrower groups of travellers. While initially developed to analyse the differences in the profile of airplane flyers and non-flyers, the psychographic theory suggests that there are two extremes of tourist motivation: *psychocentric* and *allocentric*. *Psychocentric* tourists tend to be self-inhibited, self-centred, nervous and non-adventurous, seeking what they already know and is common and acquainted to them.

Figure 2.9 – Plog's psychographic personality types



Source: After Plog (1974)

On the other hand, *allocentrics* are outgoing, self-confident, and are characterised by a great level of adventure, curiosity, and willingness to experiment and to experience the unknown. Between these two opposed categories, three groups emerge: *near psychocentrics*, *mid-centrics* and *near allocentrics*, presenting mixed characteristics of the extreme groups. Most travellers can be classified as *mid-centrics*, a group categorized by displaying a balance between allocentric and psychocentric motivations. They tend to search for relaxation, natural and historic features, the need for a change from daily routines, the search for pleasures such as food, clime, romance, etc, and for pleasant social interactions with friends and relatives (Plog, 1972, 1974).

Geographically speaking, the author established the relation between the psychographic types and the development of tourism destinations. Similarly to Christaller's theory (1963), Plog argues that the destinations are first discovered by a small number of people – the allocentrics. These are the most suitable types of tourists to be pioneers in arriving at an untouched locality (where tourism is not developed yet), as they enjoy discovering remote destinations and experimenting new and special forms of tourism. They search the exotic, educational and cultural attractions and find satisfaction in the sensation of power and liberty, reason why they prefer flexible holidays. Psychocentrics will probably be repeated visitors to already known and well developed resorts, as they prefer an established and traditional tourism industry and the comfort of the existence of tourist facilities. They choose destinations that provide a holiday experience very similar to their daily lives, accessible by car and purchase organized and well structured tourist packages. More recently, Plog renamed the personalities' types: psychocentrics are now the *dependables* and allocentrics, the *venturers*. According to the author, "*If a destination's planners understand the psychographic curve, it is possible for them to control development or progress along the curve and maintain an ideal positioning. Few places do this, however, because local authorities don't understand the dynamics of what contributes to success and failure.*" (Plog, 2001, p. 18).

Cohen's model shows significant similarities with Plog's psychographic system. By analysing tourists' types according to the level of dependency on tourism industry and the relationship with the host communities, the author segmented them into four different groups: (i) *the drifter* avoids contact with tourism industry and identifies himself with local residents, immersing in local cultural; (ii) *the explorer* seeks to 'get off the beaten track', organises his own trip, although using tourism infrastructures and maintaining his normal lifestyle, nonetheless, his motivations lay mainly in cultural experiences; (iii) *the individual mass tourist* uses most of the services provided

by tour operators, although deciding his own itinerary. He is more flexible, independent and individualistic than the final category, the (iv) *organised mass tourist*. These tourists show little desire of adventure and rely on tour operators to organize the complete holiday experience, travelling in their "environmental bubble" and maintaining no contact with local community (Cohen, 1972). While the two first types can be categorized as non-institutionalized tourists who seek novelty (Plog's allocentrics, near allocentrics and a part of mid-centrics), the last two are adepts of institutionalized tourism, attracted by familiarity and showing psychocentric characteristics. Similarly to Plog's model, the groups defined by Cohen show a sequence in arriving at destinations, depending on the physical plant derived of tourism development existent at the time.

Plog's and Cohen's original models contributed significantly to the construct of TALC, as they brought to discussion the theory that the changes in tourists' types relate to the subsequent physical changes in the destinations, raising the topic of destination decline.

Table 2.4 – Integration of resort cycle, product life cycle and tourist typologies

Tourist Typologies						Resort Life Cycle		Product Life Cycle
Cohen (1972)		Cohen (1979)		Plog	Smith	Butler model	Modified	
Modern Pilgrimage	Existential Experimental	*Non-institutionalized*	Explorer	Allocentric	Explorer	Exploration	Discovery	Introduction
	Experiential		Drifter		Elite Off Beat	Involvement		
Search for Pleasure	Diversionary	*Institutionalized*	Individual Mass	Mid-centric	Incipient Mass	Development	Growth	Growth
	Recreational		Organised Mass	Psychocentric	Mass Charter	Consolidation	Maturity	Maturity (Saturation)
						Stagnation		
						Decline	Decline	Decline
						Rejuvenation	Rejuvenation	

Source: Gordon and Goodall (1992, p.44)

The earlier efforts of Noronha (1976), Stansfield (1978), Doxey (1975) and Wolfe (1952) on the process of change and development of tourist destinations also influenced Butler's tourist area cycle. Noronha's model of tourism development consists of three stages: (i) discovery; (ii) local response and initiative; and (iii) institutionalisation. The author states that tourism initially

develops in a spontaneous way and is based on local initiatives, but as local resources prove to be incapable of sustaining tourism growth, the political and economic authorities intervene, the control is transferred to outsiders and facilities become bigger and adopt international standards, that is, there is a change to an industrialized form of tourism. The process of tourism development withdraws control from locals, and consequently, their participation in benefits of tourism also decline (Noronha, 1976).

Table 2.5 – Index of tourist irritation

1. Level of Euphoria
Locals are enthusiastic by tourist development, welcoming tourists and providing a mutual feeling of satisfaction. There are opportunities for locals and money flows in along with tourists. Associated with the beginning of tourist development, with lack of planning or control from the authorities.
2. Level of Apathy
The industry expands and tourists are taken for granted and seen as a target for profit. The contact between tourists and residents becomes formal. Planning efforts concentrate almost exclusively on marketing.
3. Level of Annoyance
As tourism industry reaches saturation point, the host community is no longer able to handle the number of visitors with the expansion of the facilities. Although residents start to question the development of tourism industry, local authorities' major concern is the expansion of tourist infrastructures.
4. Level of Antagonism
The tourist is seen as the source of all that is bad, bringing negative social, environmental, economical and physical impacts. The pre-existent politeness gives now place to antagonism and the host community strongly opposes tourists. Planning consists of increasing the advertising of the region. There is a clearly open hostility from locals towards tourists.

Source: Doxey (1975)

The effect on local residents of a tourism development process similar to the one described by Noronha may lead to what Doxey (1975) calls the "Irridex", or the "Index of tourist irritation". Based on a study developed both on Barbados and on Niagra-on-the-Lake, the author confirmed the existence of reciprocating impacts between tourists and host communities that can be measured in degrees of "irritation". Although it may seem that this theory does not have a direct relation to the resort cycle, it demonstrates an attempt to show that there is a cycle related to tourist/community relationships in a specific resort area. Therefore, it was considered by Butler within the TALC model, as it confirms the fact that, as tourism develops, the host community's

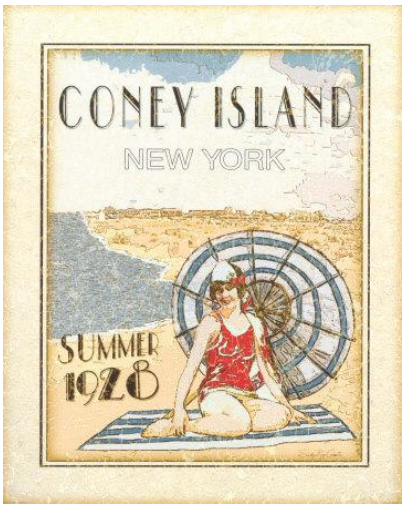
responses towards tourists will change in a predictable sequence (comparable to the one described by Butler). The index describes different levels of attitudes of local residents towards tourists, determined by the compatibility between them (Table 2.5).

At the time of the creation of TALC, the "resort cycle" concept was discussed by Stansfield (1978) when addressing the rise, decline and subsequent rebirth of Atlantic City through the legalisation of gambling and casinos. Although this was considered by some authors, namely Butler himself, (Butler, 1998a, 2000, cit in Butler, 2006) the first time that the concept was used, it is now recognised that the original utilisation of "resort cycle" appears in a paper by Brougham and Butler (1972) introducing many of the focal points of the 1980 TALC model. In fact, it argues the issue of tourists' flows, the subsequent growth of destination areas, the choice of specific destinations and the movement from a destination to another. By utilising resorts data, it was concluded that the numbers of tourist arrivals describe an asymptotic curve resultant of destination's birth, growth and decline – the main assumption of TALC.

Although further in time, the paper addressing the tourism development of Atlantic City (Stansfield, 1978) demonstrates how the resort cycle can adopt an S-shapped curve and, moreover, brings to the discussion the issue of rejuvenation of declining tourism destinations, in this case, innovating through the introduction of a new tourism products or concept.

The process of change of tourism destinations had been earlier recognized and supported by Wolfe (Wolfe, 1952, cit in Butler, 1980, 1997, 2006) when describing the tourism development of Wasaga Beach, a traditional Canadian cottage resort that was converted in a low quality and mass tourism destination. The beach, its original attraction, was reduced to second plan in what concerns to tourists' attractions. The destination became "divorced from the geographic environment", a statement wisely used by the author to address the conversion of the natural and endogenous attractions to artificial and manmade ones, characteristic (although not exclusive) of the mass tourism destinations.

Figures 2.10 and 2.11 –Promotional posters of Coney Island from the beginning of 20th century



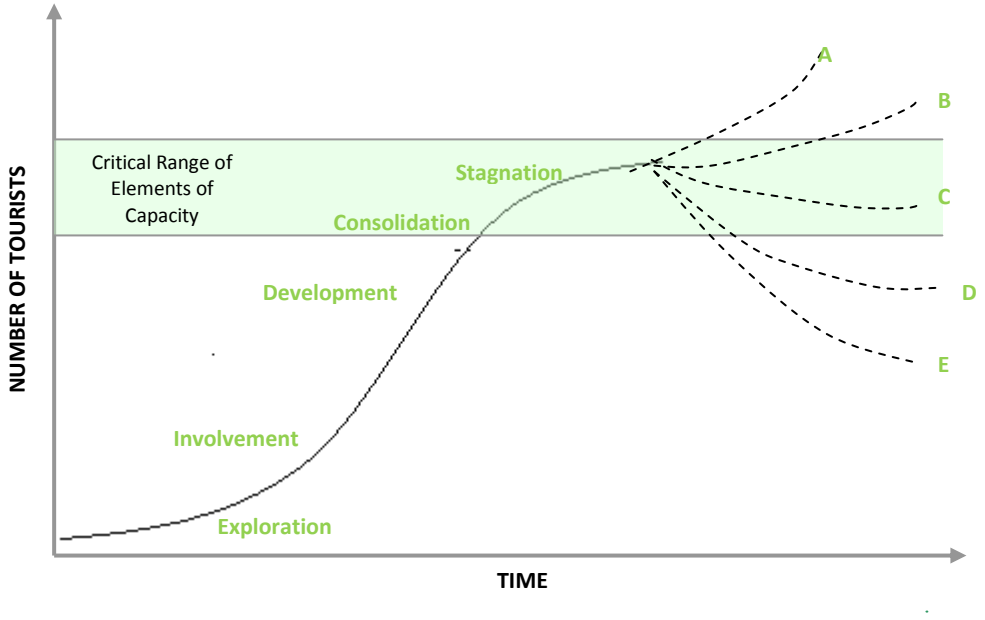
Source: www.allposters.co.il (2009)

Although not addressed in Butler's seminal paper, Snow and Wright's case study of Coney Island (1976) appears to have had some influence in the model. The work describes the life cycle of that resort, located near New York, and divides it in four stages: (i) *beach era* (1829-1875); (ii) *hotel and midway era* (1876-1896); (iii) e*nclosed amusement park era* (1897-1910); and (iv) l*ong period of increasing crowds and eventual decline* (1911-1976). The process of development began with a number of tourists that arrived at the region attracted by the beach and sea.

In this early stage, there were a few hotels and later (mid 1860's), public transportation to the resort was provided. The second era was marked by the construction of large hotels with their own railway connections, which caused a rapid increase of visitor numbers, attracting all classes of people. Crime and prostitution were some of the negative social impacts of tourism observed at this stage. The enclosed amusement park era refers to the construction of three family-oriented amusement parks in order to replace the gambling, crime and prostitution that had formerly characterised the area, which resulted in the reaching of the peak numbers of visitors in 1910. In 1920, the New York subway system arrived and opened Coney Island to the excursionists for the price of a subway ticket. Low spending day trippers were increasingly arriving at the destination until it became incorporated in New York metropolitan area.

A large spectrum of authors and theories contributed significantly to Butler's TALC model, as the drawn conclusions lead to the same assumption, the one that remains the basis of resorts cycle: that destinations' dynamism make them evolve and as the numbers of tourists grow, their types also change, as well as the physical, social and economic character of the destinations. According to Butler (2006), *"(…) there was nothing devastatingly complicated or original in the data or facts on which the model is based.". "Butler put into the realistic cyclical context a reality that everybody knew about, and clearly recognised, but had never formulated into an overall theory."* (Lundgren, 1984, p. 22). Butler's tourism area life cycle model can be graphically represented as in figure 2.12.

Figure 2.12 – Hypothetical evolution of a tourist area



Source: Butler (1980)

Based on the main findings of the formerly related writings, Butler (1980) architected the above model to illustrate a hypothetical development process of tourism destinations. Similarly to the product life cycle concept, the numbers of tourists arriving to a specific location will proceed slowly in the early stages of the cycle. The ***exploration stage*** is mainly characterised by small numbers of visitors (Plog's allocentrics, Cohen's explorers or Christaller's artists) that are attracted by the uniqueness of the place, by the natural, cultural or physical features of an undeveloped location where tourism facilities are not available yet. At this point, there is a significant contact

between tourists and the host community (typical of the types of tourists arriving) and tourism social and physical impacts are practically inexistent.

With the growth of tourists in number and frequency, the ***involvement stage*** occurs and some facilities are being provided primarily or exclusively for tourists. At this phase, it can also be observed that some advertising to attract tourists is put into practice and an initial market segment is defined, as well as the emergence of a tourist season, some level of organisation in travel arrangements and the intervention of government and public sector.

When the destination reaches the ***development stage***, the number of tourists exceeds or equals the permanent local residents, a situation that results from promotional efforts in tourist's generating regions. The subsequent development of larger additional tourist facilities with external control and using imported labour leads to the decline of local involvement and development control. At this point, the original natural and cultural endogenous attractions are supplemented by man-made facilities. In result, the changes in the physical environment are now visible. There is a well defined market, mainly composed by Plog's mid-centrics or Cohen's institutionalized tourist.

Once the capacity levels are reached, the rate of increase in tourists' arrivals will begin to decline and the destination enters the ***consolidation stage***. This does not mean that the total number of tourists is declining; on the contrary, they continue to grow and to exceed the number of residents, although at a slower pace. The economy of the area depends now mainly on tourism, which leads to the concentration of efforts on extending the tourist season and widening the markets. The residents' attitudes towards tourism development is are of discontent and opposition, especially from those not involved in the process, following the pattern described by Doxey (1975).

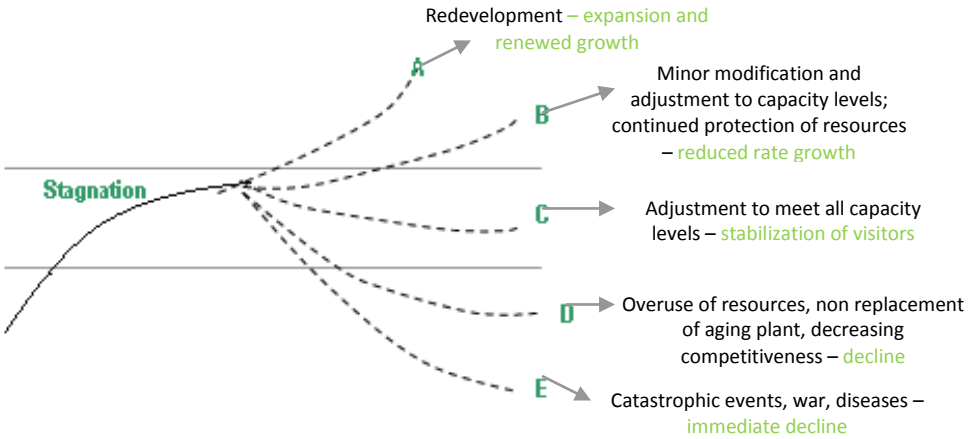
The peak numbers of visitors is observed during the ***stagnation phase***, as the capacity levels are reached or exceeded. The destination area shows significant negative environmental, social and economic tourist impacts. Although it presents an established image, it is no longer in fashion, appealing now to psychocentrics or organized mass tourists, as defined by Plog and Cohen, and relies on repeated visitors in order to maintain the levels of visitation. The natural and cultural

attractions are replaced by imported artificial facilities, and the destination becomes finally "divorced from its geographic environment" (as stated by Wolfe in 1952).

The following stage is characterised by the reduction in the number of visitors numbers and consequently in the economic benefits that derive from tourism. When entering the ***decline stage***, the destination is no longer competitive, especially when compared to new attractions and destinations, and the decline is visible both spatially and numerically. The market that subsists is the weekend or day trips. Tourist facilities are replaced by non related structures, as the destination begins to abandon tourism as its primary economic source. Ultimately, the area may completely lose its tourist function.

From this point on, different scenarios can emerge, reflecting distinct market responses (namely, the number of visitors arriving). This depends on the strategies and management decisions taken by tourism destinations' management and/or its industry. According to Butler, the curve direction in the ***post-stagnation*** period reflects five situations and lead to different interpretations (Figure 2.13).

Figure 2.13– Post-Stagnation stage scenarios



Source: After Butler (1980)

The situation demonstrated by curves A and B, suggests a continued **growth** of numbers of tourists resultant of rejuvenation and adjustment strategies. On the contrary, curves D and E show a marked **decline** in the numbers of tourists and the inexistence of a tourism strategy in order to increase the destination competitiveness and attractiveness. In the case of the

immediate decline, it would be extremely difficult for a destination to return to high levels of visitors. If the decline is maintained for a long period, the destination will no longer be attractive to tourists, even if or when the problem is solved. Curve C points to a long-term stability in destination demand (Butler, 1980).

When the destination area enters the stagnation stage, the public and/or private sector should develop the necessary efforts in order to prevent its decline. The process of rejuvenation or redevelopment will depend on management decisions, desired to be proactive, rather than reactive. If the destination adopts a scenario of decline, it will be much more difficult to recover the levels of attractiveness and competitiveness in global markets. Long before the tourism destination enters the decline stage, planning and decision making should be made to ensure the successful continuation of resorts (Agarwal, 1995). Therefore, it is fundamental to have management tools that provide organisations with reliable information that support decision taking and decision making.

> *Unless more knowledge is gained and a greater awareness developed of the process which shape tourist areas, it has to be concluded, with Plog, that 'many of the most attractive and interesting areas in the world are doomed to become tourist relics'."* (Butler, 1980, p. 12).

Buhalis synthesized the characteristics of the tourism area life cycle stages (Table 2.6), namely in what relates to tourism impacts. It also demonstrates that planning, management and marketing actions are required by the different stages, which results from the experienced differences between demand and supply along the destination evolution (Buhalis, 2000).

Although Butler refers that *"(…) there was nothing devastatingly complicated or original in the data or facts on which the model is based.*" (Butler, 2006, p. 14), Tourism Area Life Cycle remains one of the most cited and recognised constructs of destination growth, development and change. Since its original publication in 1980, Butler's work has inspired several authors to apply the life cycle concept to a broad spectrum of situations and locations.

Table 2.6 – Destination life cycle and tourism impacts

Impact Analysis	Introduction	Growth	Maturity	Saturation	Decline
Situation	New trendy destination	More people interested Investment in accommodation & facilities	Maximum visitation Increasing facilities	Oversupply Original demand moves	Reduction of demand Special offers to boost visitation
Destination Characteristics					
Visitor Number of Tourists	Few	Many	Too many	Many	Many
Growth Rate	Low	Fast growth	Fast growth	Slow growth	Decline
Accommodation Capacity	Very low	Low	High	Very high	Very high
Occupancy levels	Low	Very high	Very high	High	Low
Prices of Services	High	Very high	High	Low	Very low
Expenditure per capita	High	Very high	Very high	Low	Very low
Visitor Types	Drifters	Innovators	Innovators	Followers	Cheap-mass market
Image and Attractions	Low	Very high	High	Low	Very low
Tourists are perceived as	Guests	Guests	Customers	Customers	Foreigners
Marketing Response					
Marketing Target	Awareness	Inform	Persuade	Persuade	Loyalty/ New market
Strategic Focus	Expansion	Penetration	Defence	Defence	Reintroduce
Marketing Expenditure	Growing	High	High	Falling	Consolidate
Product	Basic	Improved	Good	Deteriorates	Decay
Promotion	Introduction	Advertising	Travel trade	Travel trade	Travel trade
Price	High	High	Lower	Low	Below cost
Distribution	Independent	Independent	Travel trade	Travel trade	Travel trade
Economic Impacts					
Employment	Low	High	Very high	High	Low
Foreign Exchange	Low	Very high	Very high	High	Low
Profitability of private sector	Negative	Growing	Very high	High	Decline
Income of residents	Low	Very high	Very high	Low	Very low
Investments	Low	Very high	Very high	Low	Very low
State revenue and taxes	Low	Very high	Very high	Low	Very low
Economic structure	Balanced	Tourism oriented	Tourism dominated	Tourism dependent	Unbalanced and not self sufficient
Dependency on intermediaries	Negligible	Low	High	Over-dependent	Over-dependent
Imports	Low	Very high	Very high	Very high	High
Inflation	Low	Very high	Very high	High	Low
Social Impacts					
Types of Tourists	Allocentrics	Allocentrics	Midcentrics	Psychocentrics	Psychocentrics
Relationship between locals and tourists	Euphoria	Apathy	Irritating	Antagonism	Final
Demographics at destination	Immigrations Older residents	Youth stays to work in tourism More balanced	Balanced	Balanced	Immigrations as no jobs available Older residents
Migration to the destination	Low	High	Very high	High	Low
Crime at the destination	Low	High	High	Very high	Very high
Family structure	Traditional	Effective	Modern	Modern	Modern

Environmental Impacts					
Environment and landscape	Unspoilt	Improved	No respect	Polluted	Damaged
Conservation and heritage	Unspoilt	Improved	No respect	Decay	Damaged
Ecological disruption	Unspoilt	Improved	No respect	Decay	Damaged
Pollution related to tourism	Negligible	Low	High	Very high	Very high
Water pollution	Negligible	Low	High	Very high	Very high
Congestion and traffic	Low	Low	Very high	Very high	Low
Erosion	Low	High	Very high	Very high	Very high

Source: Buhalis (2000, p.105)

2.3.2.1 Limitations and criticisms to TALC model

Although widely recognised and applied in tourism research and practice, Butler's life cycle concept is far from being a pacific and consensual issue. If many authors found high levels of adherence to the proposed methodology in their empirical studies, others disclose some criticisms. Prosser (1995) summarized the main criticisms to the model in five categories:

i. Doubts about existing a single model of development;

ii. Limitations on the capacity issue;

iii. Conceptual limitations of the life cycle model;

iv. Lack of empirical support; and

v. Limited practical utility.

It is recognised that the shape of destination areas' evolution is dependent on more than just the criteria defined by Butler. Although the author argues that the proposed life cycle is only a hypothetical one, other patterns of development can occur, as the internal and external forces interacting with tourism strongly influence and shape resorts development. Criticisms related to the fact that Butler's model does not consider these internal and external factors are made by Cooper and Jackson (1989), Cooper (1992), Getz (1992), Haywood (1986, 1991), O'Hare and Barrett (1997) and Dong, Morais, and Dowler (2004). Agarwal states that "*(…) owing to the unpredictable nature and variability of internal and external forces, in spatial and magnitude terms, it is extremely difficult to apply the resort model holistically to destination area evolution and development*" (1997, p. 67). Cooper (1992) goes further and identifies influencing supply-side factors, such as rate of development, access, government policy and competing destinations, and

demand-side factors, namely the changing nature and profile of tourists as destination evolves. The role of internal and external agents is equally crucial to resort evolution. The decisions made by planners and managers during the life cycle stages will definitely shape the destination evolution path (Cooper & Jackson, 1989). For instance, in this context, Debbage (1990), Ioannides (1992), Williams (1993), Weaver (1988, 1992), Oglethorpe (1984) and Andriotis (2005) refer to the impact of external control and dependency on foreign tour operators and organisations as a major influence on the way tourism destinations develop (in most cases, this situation tends to lead destinations to decline).

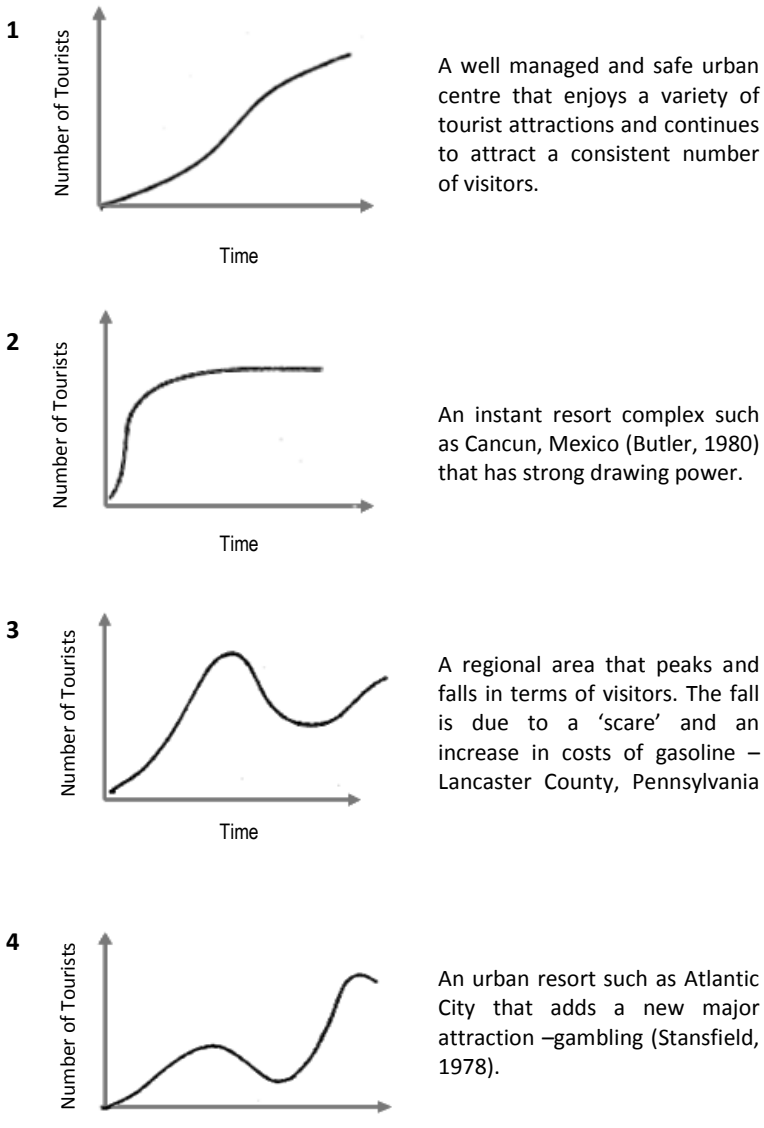
Haywood (1991, pp. 35-37) identifies seven economic and social forces that influence the evolution of a destination and that ultimately determine its success: (i) rivalry among tourist areas; (ii) developers and development of new tourist areas; (iii) substitutes for the tourism/travel experience; (iv) environmentalists and concerned publics who oppose tourism or tourism development; (v) transportation companies, tour operators, intermediaries, accommodation and suppliers – bargaining power; (vi) tourists – needs, wants, perceptions, expectations and price sensitivity; and (vii) governmental policy and regulatory bodies and forces. Zhong, Deng, and Xiang (2008) refer some internal factors inherent to destinations affecting tourism industry evolution, such as the uniqueness of resources and attractions, local residents and their attitudes towards tourism development, gradual deterioration of tourism resources, management, service practices and qualities. Producers, consumers and regulating authorities are among the external factors considered in related studies (Keller, 1987, cit in Zhong et al., 2008).

Other events such as political changes or natural catastrophes can also affect the number of visitors to a specific area and, therefore, the resort development. For instance, O'Hare and Barrett concluded that, due to the civil war in Sri Lanka, there have been two different cycles, one before and one after the war. The decision made by planners and managers to include a new tourist facility or attraction can have a positive impact in visitors numbers and alter the path of evolution. Stansfield (1978) observed the revitalisation of Atlantic City in result of the legalisation of gambling and the subsequent construction of casinos in that destination.

The role of entrepreneurs is another issue raised when analysing the forces that shape the pace and direction of change in tourism destinations. Russell and Faulkner (2004) consider different types of entrepreneurial activity under elements of turbulence, chaos and unpredictability,

combining chaos theory with tourism area life cycle model. Their research lead them to conclude that entrepreneurial creativity can endow a destination with a competitive advantage over another. The combination of chaos and complexity theories' principles with TALC model contributes to a more holistic understanding of destination development, helping to overcome the limitation of the model regarding the impact of external and internal unpredictable events and triggers of change.

Figure 2.14 – Alternative tourism area life cycle patterns



Source: Haywood (1986)

Tourism destinations characteristics and attributes are particular, that is, the features that enable their attractiveness and the referred external and internal forces are unique and destination specific. Therefore, the development cycle is also destination specific and the tourist development of a given area depends on its characteristics, which cannot be isolated from this analysis. Consequently, the time span for each stage and for the cycle as a whole is variable between destinations, resulting in different shapes and patterns (Gordon & Goodall, 1992; Haywood, 1986). Butler himself observed that *"(…) not all areas experience the stages of the cycle as clearly as others*" and that ''(…) *the shape of the curve must be expected to vary for different areas''* (1980, pp. 10-11). Within this context, Haywood provided some examples of different development patterns in specific destinations (Figure 2.14), suggesting that the model has to consider specific situations in order to provide an adequate understanding and analysis of destinations development. Thus, different destinations can assume distinct development patterns. The introduction of innovation at destination level may assume a significant role in shaping the path of tourism growth.

The applicability of TALC may be limited when the S-shaped curve is assumed to be the independent variable, and that other variables can be concluded from the curve. Cooper (1994) argues that the curve results from a set of internal and external forces, therefore, the curve is the dependent variable, providing a useful explanation of the forces that drive it.

The lack of long-term data is pointed by several authors as a problem that makes TALC difficult to operationalise (Agarwal, 1997; Butler, 1980; Cooper, 1992; Haywood, 1986; Hovinen, 2002; Lagiewski, 2006). Agarwal (1997) goes further on the issues regarding data limitations and refers to the temporal discontinuity of tourism information, spatial scale and scope of data available, lack of standardisation of compilation and collection methods (which bias the determination of change and trends) and data reliability, since tourism statistical data is often subject to errors and omissions, at all spatial scale of analysis.

The unit of analysis, or the definition of geographical scale of analysis, is considered as critical in assuring TALC validity as an operational tool. The original model considers the destination as a whole, a single product, instead of a mosaic of different elements, products and areas, each with its own life cycle. Thus, several authors argue that TALC should be a multi-product analysis as a general approach may bias the results and, consequently, the necessary strategies to be

implemented (Agarwal, 1995, 1997; Corak, 2006; Haywood, 1986; Hovinen, 2002; Lundgren, 1983, 2006; Marois & Hinch, 2006; Pulina & Biagi, 2006). However, Berry (2001) comes forward and contradicts this idea by stating that TALC's purpose is to analyse the totality of a region's tourism development and that the analysis of individual market segments that compose the whole of the region should be performed as an additional exercise when needed.

Due to the referred criticisms and limitations, namely the lack of reliable and adequate statistical data, the ignorance of the impact of external and internal forces that interact with tourism industry, the tourism area life cycle model is, considered to be unable to forecast future trends. Butler (1980) stressed that it was not envisaged to be used as a prescriptive tool. Despite of the criticisms, Haywood's (1986) proposals on conceptual and measurement issues regarding TALC brought important insights on how to make the model useful for analysis and forecasting objectives. According to the author, forecasting models should consider a number of different scenarios according to the available marketing strategies and competing destinations. He states that most models have limitations in predicting stagnation and decline stages and cites two possible models: Cooke and Edmond's LIFER (Life Cycle Forecaster) (1973) and Wilson's approach involving the discovery of leading indicators of 'stagnation' stage (1969, cit in Haywood, 1986, p. 161): (i) decline of the proportion of first time visitors vs. returning visitors; (ii) declining profits of major tourism businesses; (iii) tourism industry over capacity; (iv) emergence of new and accessible competing destinations; (v) decline of advertising elasticity and increase in price elasticity; (vi) visitor's length of stay; and (vii) style and period-of-life changes among prospective market segments.

Although the framework of TALC suggests different strategies according to the development stage, it is erroneous to assume that only one strategy can be followed in each stage. Several strategies can be applied depending on the needs and tourism development objectives of the resort (Haywood, 1986). For instance, different types of innovations can be introduced according to the dynamics verified in each stage of destinations' development.

In response to the limitations found in TALC's application, several authors suggest modifications to the model. Strapp (1988) analysed the second homes market in Sauble Beach, Ontario, emphasising the transition from a tourist resort to a retirement centre in result of previous holiday makers' acquisition of second homes (new product development, re-orientation). He

suggests the introduction of a "stabilisation stage" related to the phase when the tourist dimension develops into a long-term, full year community. Agarwal (1994) defends that TALC should include a re-orientation stage before decline/ rejuvenation, where the restructuring efforts that are inaugurated before decline happens are taken into account and Baum advocates the introduction of 'reinvention' stage as a subset of rejuvenation. According to Handy's sigmoid curves, the reinvention process extends the life cycle through a process of exit and re-entry (Baum, 1998).

Regarding the evolution and specificities of European mass tourism destinations, Knowles and Curtis (1999) introduce three new sequential stages in post-stagnation: (i) market volatility and partial rejuvenation; (ii) spiralling decline; and (iii) stabilisation. The first suggests a temporary boom where previous visitor numbers are recovered due to price discounting and quality improvement. However, this can turn into long term stabilisation or a new increase in visitors' numbers if innovation is introduced.

Hovinen's suggests the introduction of a maturity stage where the multiple products and elements with different cycles co-exist, overcoming this specific limitation of TALC model (Hovinen, 1982, 2002). This is supported by Getz that, similarly to Hovinen, also found different cycles in Niagara Falls (Getz, 1992).

Other alterations combine TALC with different theories in order to overcome some limitations of the model. In this context, one can highlight the work of Debbage (1990) who combines TALC with Markusen's profit cycle, as Butler's model does not consider organisational behaviour as the cycle evolves, and of Russell and Faulkner (2004) who propose an alternative framework combining TALC with chaos/complexity theory, emphasising the role of entrepreneurs on tourism development and, consequently, of innovation.

Although the existence of several limitations and criticisms, and the introduction of a set of changes by some authors, the research made on Tourism Area Life Cycle always refer to the original Butler's model.

In fact, TALC is still considered to be a useful framework for research, enabling the understanding, description and analysis of destinations development process and consequently the changes

destinations go through over time (Baum, 1998; Cooper & Jackson, 1989; Hovinen, 1981; Prosser, 1995; Russell & Faulkner, 1998; Williams, 1993). In academic research, it provides a valuable organising concept and a conceptual basis for comparing different destinations' evolution. It also creates awareness that, if appropriate long-term planning and management decisions are not made, destinations will decline, which emphasises the need for proactive and strategic planning (Hovinen, 2002), based on the development of innovation.

In this context, Cooper and Jackson (1989) and Cooper (1990) highlight the descriptive and prescriptive utility of TALC, as it provides a tool that, if properly applied, describes the evolution of specific tourism destinations and might be used a guide to develop and evaluate adequate strategies.

> *"The strength of the life cycle approach (Berenson) is seen as integrating the disparate factors involved in tourism development, it is an excellent descriptive tool. This becomes more attractive when it is realised that all elements of tourism demand, supply and organisation at destination level can be integrated within this one explanatory framework. In particular the integration of physical development factors (investment, organisation, scale, impact, planning) with those of demand (changing market volume and characteristics as visitors adopt the destination) at each stage of the cycle provides tourism researchers with a glimmer of the elusive unifying concept or generalisation of tourism. (…) tourism researchers should not be swayed by those who criticize life cycle for lack of operational value. By regarding destinations as dependent upon the actions of managers, the tourist industry and their markets, the life cycle provides an integrating medium for the study of tourism, a promising vehicle for future research, and a frame of reference for emergent themes in tourism*" (Cooper, 1992).

2.3.3 Destination development and innovation

Despite the number of studies on the development of tourism destinations, namely those applying the Tourism Area Life Cycle model, there is few evidence on the role that innovation plays in the evolution of tourism territories. Some authors, including Brooker and Burgess (2008),

argue that when destinations reach stagnation stage, strategies of rejuvenation based on a set of factors should be brought in, such as:

- Embracing cooperation and collaboration instead of competition;
- Developing a comprehensive strategy with inputs from all stakeholders (participatory planning);
- Adaptation to market changes;
- Development of incremental and radical innovation;
- Diversification and differentiation.

Alongside Tinsley and Lynch (2001), Faulkner and Tideswell (2005) and Skinner (2000) these authors highlight the need to establish collaborative networks and strategic alliances among tourism stakeholders (local, regional, national and international, public and private sector and local residents) in order to achieve forms of sustainable destination development, maintain or increase competitiveness and successfully reach rejuvenation.

However, innovation is relevant not only when tourism destinations are declining, but at all stages of development, especially due to the fact that trends in consumer behaviour are changing rapidly, accelerating the life cycle of tourism-related products.

Thus, in result of the lack of studies on innovation and tourism development, an approach was made to the role of innovative and collaborative processes in industrial clusters according to their different stages of evolution. It is acknowledged that who innovates, how much innovation is undertaken and where it occurs depends on the stage of the cluster life cycle (Klepper, 1996). The author claims that clusters at an introduction stage (embryonic clusters) rely heavily on innovation that comes mainly from small firms. The rate of innovation is maintained during growth stage. However, those who innovate now are large firms. Maturity and decline stages are characterised by low innovation rates. Nevertheless, the propensity to innovate still exists, although in large firms in maturity stage and small firms when the cluster enters in decline. It can be thus concluded that the tendency for innovative activity to cluster and for the development of innovation networks may be higher during the early stages of life cycle and more dispersed in maturity/ decline (Audretsch & Feldman, 1996a).

Gort and Klepper (1982) characterise the nature of innovation according to the evolution of clusters and products. In the initial stage, innovation intensity is high, innovations are mainly radical, new products are created based on information coming from a variety of sources (internal and external). The unexploited opportunities to innovate and the low barriers to entry attract new firms. Product diversity is high, and thus the competition is based on quality. When the product becomes standardised and firms produce similar products due to the effect of imitation, a growth stage is reached. At this point, innovations are more incremental, the focus is mostly on process innovation and firms compete through price. Finally, maturity arrives and innovation opportunities deplete, which leads to a low innovation intensity. If a cluster is not capable of reinventing itself, then it will decline. According to Clar, Sautter, and Hafner-Zimmermann (2008), decline occurs because firms lose innovativeness and competitiveness due to lock-in resultant from long established networks and structures and excessive reliance on local tacit knowledge, neglecting new and external linkages. However, rejuvenation is possible and these clusters may be revived by economic policies aiming at the stimulation of R&D, skills training, business support services and development of networks encouraging partnerships and alliances towards innovation or the recreation of initial stage conditions (Pouder & St John, 1996).

2.4 Conclusion

This chapter has reviewed the main concepts and paradigms of development. Main findings point towards the fact that development implies changes that are closely tied to the process of economic and social transformation of societies. As it is pointed out by Mabogunje (1980), changes can assume several dimensions such as economic growth, modernisation, distributive justice, socio-economic transformations and spatial reorganisation. More recently, the sustainability issue emerged and is nowadays endowed in the concept of development. Most of these dimensions point to the need of some type of change in order to make development to flourish. This is confirmed by Rostow's model of economic growth (1990), when it is argued that the development of societies demands for change, for the introduction of new technologies and methods in the economic and social settings. That is, the introduction of innovation. Schumpeter, in his writings, also argues that development only happens through innovation and discontinuing changes in the economic system. However, it is worth noting that, alongside innovation,

knowledge is considered as a primary resource for change, development of societies and innovation.

Bearing this is mind, societies and economies ought to build a model of development that, in parallel to the introduction of innovation processes, places knowledge as a central production factor and introduces the necessary structural (organisational) shifts conducting to leadership and suitable governance structures.

As a result, the development of tourism territories is analysed with the aim of understanding the factors that prompt the evolutionary path of destination areas. It is concluded that most tourism development models are grounded on a geographical/spatial perspective.

As any regional cluster of economic activity, tourism destinations are dynamic and evolve constantly throughout the time. However, the tourism phenomenon shows distinctive and complex features.

In this chapter several models are discussed. The discussion unveils that they show a sequence of stages that go from the absence of tourism industry (infrastructure, demand, tourist attractions and activities), to an inevitable saturation resulting from mass tourism, degradation of physical settings and decline. The patterns of supply, demand, organisations involved in tourism planning and organisation, investment and community behaviour towards tourism change over time.

Among the discussed models, Butler's tourism area life cycle (1980) is undoubtedly the most comprehensive as it comprises the diversity of factors that determine tourism destinations' development process. It also includes a post-stagnation scenario, where destinations can effectively proceed to decline, maintain the number of visitors or engage in a rejuvenation process, which can only be achieved through innovation.

Nonetheless, considering that the life cycle of tourism products are shortening due to the rapid changing in consumers' behaviour and motivations, and the fact that the imitation of innovations is a constant, it is argued that innovative practices are mandatory at all stages of evolution. This effort should be made jointly by all tourism stakeholders in order to create an integrated experience at regional level.

This is supported by Haywood (1986) who argues that, instead of following an s-shaped curve as defended by Butler, different destinations present distinct attributes and characteristics influencing their attractiveness and, thus, may present alternative life cycle patterns. In fact, the introduction of a significant innovation at any stage of the life cycle may change the direction of the development curve.

Despite these findings, it is concluded that there is little evidence about the role of territorial innovation in the evolution of destinations. It is, however, recognised the need for tourism actors to develop radical and incremental innovations and to engage in collaborative practices with agents from all geographical scopes and business sectors in order to assure a sustainable destination development and a long-lasting competitiveness. Nonetheless, there is little empirical evidence on this matter.

The following chapter addresses important issues that allow filling in some conceptual gaps in the study. The overall concepts, models, theories and practices of innovation are approached, in order to subsequently understand how innovation in tourism can be developed. Considering the importance of territories, regions and organisational networks for tourism, a focus is given to the main territorial innovation models.

Chapter

3

Concepts and models of innovation: focusing on territorial dimension

3.1 Introduction

In the previous chapter, an extensive analysis is made to the main concepts, theories and models of development, particularly those applied to tourism destinations. The aim was to understand whether innovation has a significant role in tourism development, or at least if the existent models approach this dimension as a crucial factor for the evolution of tourism territories. This chapter contains the theoretical background of innovation as a scientific domain. In the first section (3.2) the concept of innovation and the diversity of approaches are discussed, followed by a review of the several innovation taxonomies (section 3.2.1). An important contribution to the most recent models of firms' innovation is provided in section 3.2.2, where an analysis of the evolution of firms' innovation practices is made, until the "optimal" models that should be adopted by nowadays economic agents in order to assure the success of their businesses and gain competitiveness in the international markets. Innovation in the tourism industry is then approached (section 3.3), namely in what determines the innovation developed by tourism organisations (section 3.3.1) and what limits it (section 3.3.2). Also, a general overview of innovation in services is made, in order to understand which factors differentiate it from innovation in manufacturing (section 3.3.3). Finally, and after concluding the significant importance of the territory, proximity and economic agglomerations within innovative processes (section 3.4), the research lead to a review of the main territorial innovation models and the dynamics that underlie them (section 3.5).

3.2 Conceptualising Innovation

Innovation, although not being a new phenomenon, as one may consider it is as old as mankind, has not always received the necessary attention. Studies on economic change focused primarily on issues related to capital accumulation or to market behaviour, rather than on innovation. However, this situation is evolving in recent years, as the research on the role of innovation is proliferating, namely within the social sciences (Fagerberg, 2006).

As several other areas of study in social sciences, innovation lacks a common and consensual definition, remaining rather ambiguous, which challenges the understanding of its own nature (Adams, Bessant, & Phelps, 2006; Cooper, 1998). This results from the fact that the concept is

applied to different disciplines and also that in order to innovation to occur a very complex process takes place. To this matter, Kline and Rosenberg (1986) refer that innovation is a ill-defined and heterogeneous phenomenon and that it cannot be identified as entering the economy at a specific time. Innovations go through important changes during their lifetimes, transforming their economic significance.

In an attempt to develop a multidisciplinary concept of innovation Baregheh, Rowley, and Sambrook (2009) surveyed about sixty definitions. Those definitions were segmented in literature related to the following areas: (i) business and management; (ii) economics; (iii) organisation studies; (iv) entrepreneurship; (v) technology, science and engineering; (vi) knowledge management; and (vii) marketing. Their findings showed that *newness*, *change*, *product*, *organisation*, *service*, *process* and *idea* are some of the most frequent words appearing in these definitions.

One of the first and most prominent authors working on innovation was Joseph Schumpeter (1883-1950), frequently called as "*the Prophet of Innovation*" (McCraw, 2007). Schumpeter focused on the importance of innovation in economic analysis and defined the phenomenon as the setting up of a new production, covering new commodities as well as new forms of organisation. Innovation is "*(…) the carrying out of new combinations*" (Schumpeter, 1934, p. 66) and covers:

i. The introduction of a new good or of a new quality of a good;
ii. The introduction of a new method of production;
iii. The opening of a new market;
iv. The conquest of a new source of supply;
v. The carrying out of a new form of organisation.

The assumption, by many, that innovation and invention were synonym concepts lead Schumpeter to elaborate the distinction between them. Inventions are usually restricted to new ideas, sketches or models of mechanical and technical nature for a product, process or system, not leading necessarily to innovations. Innovations involve necessarily the commercial application of any new idea, accomplished through commercial transactions of the new product, process or system (Freeman, 1982). Basically, if inventions are not applied and placed successfully in the market (that is, transformed into innovations), they are economically irrelevant.

Innovation is considered as the fundamental determinant of economic change and development. Schumpeter argues that the starting point of the development process is an economic system in equilibrium or in a stationary state, characterised by the absence of variation or development (although not necessarily of growth) in result of the inexistence of innovation. This economic system is also called *"(…) 'circular flow', running on in channels essentially the same year after year – similar to the circulation of the blood in an animal organism*" (Schumpeter, 1982, p. 61), as it remains a constant recurrence of a cycle always identical to itself. The beginning of the development process occurs with the rupture of the circular flow from the production/supply side (and not on the demand side), changing the previous production systems through innovation - the *creative destruction*:

> *"These spontaneous and discontinuing changes in the channel of the circular flow and these disturbances of the centre of equilibrium appear in the sphere of industrial and commercial life, not in the sphere of the wants of the consumers of final products"* (Schumpeter, 1982, p.65).

Bearing this in mind, the author emphasizes the role played by the entrepreneur, a talented and motivated man, capable of introducing successful innovations in the productive system. These innovators are then followed by other innovators and the previous equilibrium is disrupted.

Schumpeter (1982) stresses the relevance of economic cycles, arguing that they are a crucial condition for development to happen. The period between the moment of introduction of one innovation and the moment in which it begins to produce results varies according to the nature of the innovation itself, leading to the existence of different length cycles. The author quotes three business cycles, or economic waves: the *Kondratieff* waves (also called supercycles or long waves), lasting from 50 to 60 years, *Juglar* cycles (from 9 to 10 years) and *Kitchin* cycles (40 months).

The approach made by Schumpeter to the nature of innovation differs between his early and later writings, leading to a division of his studies in *Schumpeter "Mark I"* (related to is work "*The Theory of Economic Development*", dated from 1934) and *Schumpeter "Mark II"* (associated to 1942's *"Capitalism, Socialism and Democracy"*) (Freeman, 1982; Phillips, 1971).

His first approach ("*Mark I"*) characterises innovation as a linear process where entrepreneurs play a vital role. Inventions are exogenous to the economic system and disrupt its balance when

they occur. The process then settles down until the next wave of innovation appear, creating different business cycles (the *'creative destruction'* concept). In sum, the old ways of doing things are endogenously destroyed and replaced by new ones.

Within *"Mark II"I,* the author incorporates endogenous scientific and technical activities conducted and controlled by large firms, improving their competitive advantages. The '*creative accumulation*' concept embraces science, technology, innovative investment and market. That is, innovations are introduced by large firms with accumulated stock of knowledge. The existing knowledge and innovation activities form the basis on which future innovations are created (Freeman, 1982; Korres, Lionaki, & Polichronopoulos, 2003). According to Freeman (1982), the change in the American economy at the time of Schumpeter's writings and the fast growth of Research and Development in large firms were the main reasons that lead to the shift of his approach to the nature of innovation.

Schumpeter, as a pioneer on innovation studies, was responsible for placing innovation in the centre of economic thinking and theory. After his writings, innovation issues were given a higher importance in economic literature.

In 1965, Thompson defined innovation from a very clear and simple perspective, incorporating the diffusion and commercialisation of the idea, in order to transform it into an effective innovation, and also applying it to processes, products and services: *"Innovation is the generation, acceptance and implementation of new ideas, processes, products or services"* (Thompson, 1965, p. 2). This classification as to its nature, regarding processes, products or services, is integrated in technological definitions of innovation (Afuah, 1998) that dominated the early studies on this matter.

Following Schumpeter's conceptualisation, Freeman (1982) considers that innovation includes the technical, design, manufacturing, management and commercial activities involved in the marketing of a new or improved process or equipment. Innovating requires the coupling of an invention with a potential market. This matching evolves and changes over time, as well as the national and international environment in which the innovation process occurs.

However, Rothwell (1992) defends that innovating not always imply the commercialisation of only a major technological advance, but also the use of small-scale changes in technological know-how.

The recognition of the importance of new technologies to growth, development and productivity lead the OECD (Organisation for Economic Co-operation and Development) to publish the Oslo Manual, a document that advances the guidelines to collect and analyse innovation data. The first issue, dated from 1992, presents a narrow definition of innovation, as it focus solely in technological innovation. The aim was, at the time, to measure innovation through data from industrial sector and technological product and process innovation (Organisation for Economic Co-operation and Development [OECD], 1992). Similarly, Nelson and Rosenberg's (1993) definition was limited to the institutions and mechanisms that support technical innovation, excluding organisational or social innovations.

The second edition of Oslo Manual, issued in 1997, presented the following definition of technological innovation:

> *"Technological innovations comprise implemented technologically new products and processes and significant technological improvements in products and processes. (It) has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). TPP innovations involve a series of scientific, technological, organisational, financial and commercial activities"* (OECD, 1997c, p. 31).

This issue enlarged the scope of data collection, measurement and interpretation, by including non-technological innovation as well, which relates to organisational and managerial innovation. This evolution of innovation concept reflects the results of previously conducted surveys and from the recognition that technological innovation calls for, and results from institutional and organisational change (OECD, 1997c).

> *"Non-technological innovation covers all innovation activities which are excluded from technological innovation. This means it includes all the innovation activities of firms which do not relate to the introduction of a technologically new or substantially changed good or service or to the use of a technologically new or substantially changed process."* (OECD, 1997c, p. 88).

The major types of non-technological innovation are usually organisational and managerial innovations, such as:

> *"(...) the implementation of advanced management techniques, the introduction of significantly changed organisational structures and the implementation of new or substantially changed corporate strategic orientations"* (OECD, 1997c, pp. 88-89).

More recently, in 2005, OECD's Oslo Manual totally abandoned the technological concept of innovation, replacing it for a broader one that includes organisational and marketing innovations. According to it, "*An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations"* (OECD, 2005, p. 46).

Despite this broader concept of innovation, the Oslo Manual still presents some limitations that, according to Madureira, Marques, and Costa (2008), relate to the fact that it does not consider all economic activity sectors, as it only regards the main activity of the firm (excluding multifunctional businesses) and it is firm-oriented, neglecting other types of organisations and community-driven innovation activities. An alternative to this micro-level approach is presented by the so-called Territorial Innovation Models which provide a wider analysis of innovation based on territorial dynamics among regional firms and organisations[1].

Edquist defines innovation as "*new creations with economic significance"*. The concept of economic significance strongly relates to Schumpeter's distinction between invention and innovation. In fact, a new creation or idea only becomes an innovation if it has economic significance, it should be diffused and accepted by the market in order to result in commercial transactions. Moreover, the author states that innovations "*may be brand new, but are more often new combinations of existing elements*" (Edquist, 1997, p. 1), pointing to a higher development of incremental innovations.

[1] A revision of these models is provided further on this chapter (section 3.5) and in chapter 4, which focuses on Regional Innovation Systems.

Table 3.1 - Main definitions of innovation

Author, Date	Definition
Shumpeter (1934, 1942)	Defines innovation as the carrying out of new combinations that can result in a new or improved product, new method of production, new market, new source of supply or new form of organisation. In his former work, the entrepreneur plays a key role in innovation process. His later writings stress the importance of large firms in developing innovative activities.
Thompson (1965, p.2)	*"Innovation is the generation, acceptance and implementation of new ideas, processes products or services".*
Kimberly (1981)	Defines innovation regarding its different forms: innovation as a process, innovation as a discrete item that includes products, programs or services and innovation as an attribute of organisations.
Drucker (1985, p.17)	*"Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or a different service. It is capable of being presented as a discipline, capable of being learned, capable of being practised."*
Kline and Rosenberg (1986)	*"Innovation involves the creation and marketing of the new".* Innovation is complex and subject to several changes, namely of hardware, market environment, production facilities, knowledge and social contexts.
Tushman and Nadler (1986)	Innovation is the creation of any product, service, or process which is new to a business unit. Innovation is often associated with major product or process advances although the vast majority of successful innovations result from the cumulative effect of incremental change in products and processes, or in the creative combination of existing techniques, ideas, or methods.
Dosi (1988)	Innovation involves the solution of problems. An innovative solution to a specific problem involves 'discovery' and 'creation' and the use of information from previous experience and formal knowledge.
Porter (1990, p.45)	Innovation includes "*(…) improvements in technology and better ways of doing things. It can be manifested in product changes, process changes, new approaches to marketing, new forms of distribution, and new conceptions of scope*". It is as a means *"to create competitive advantage by perceiving or discovering new and better ways of competing in an industry and bringing them to market*".
Lundvall (1992, p.8)	*"(…) innovation is a ubiquitous phenomenon in the modern economy. In practically all parts of the economy, and at all times, we expect to find on-going processes of learning, searching and exploring, which result in new products, new techniques, new forms of organisation and new markets*."
Feldman (1994)	Argues that knowledge is a central feature of innovation. Successful and viable innovations results from the integration and application of different types of knowledge (scientific, technical and market knowledge).
Amabile, Conti, Coon, Lazenby & Herron (1996, p.1554-1554)	*"All innovation begins with creative ideas. (…) We define innovation as the successful implementation of creative ideas within an organization. In this view, creativity by individuals and teams is a starting point for innovation; the first is necessary but not sufficient condition for the second".*
Edquist (1997)	Innovations are creations with economic significance. They can be new, but can also be new combinations of old elements. Emergence and diffusion of knowledge play a central role in the complex innovation process, as knowledge is subsequently transformed into new products and production processes. Innovation process involves science, technology, learning, production, policy and demand.

Author, Date	Definition
Freeman (1982)	Defines innovation as the matching between inventions and potential markets. This coupling evolves over time, alongside the national and international environment in which the innovation process develops. Innovation process engages technical, design, manufacturing, management and commercial activities involved in the commercial introduction of a new or improved product, process or system.
(Rothwell, 1994, p.26)	*"Innovation can be depicted as a process of know-how accumulation, or learning process, involving elements of internal and external learning"*
(Sundbo, 1998b)	Innovation is the introduction of new elements or a new combination of old elements in organisations.
Oslo Manual (OECD, 1992)	Focus on technological innovation, applied solely to the innovation of products or processes.
Damanpour (1996, p.694)	*"Innovation is conceived as a means of changing an organization, either as a response to changes in the external environment or as a pre-emptive action to influence the environment. Hence, innovation is here broadly defined to encompass a range of types, including new product or service, new process technology, new organization structure or administrative systems, or new plans or program pertaining to organization members."*
Oslo Manual (OECD, 1997b)	Defines technological (products and processes) and non-technological innovation (organisational and managerial).
Smits (2002)	Innovation is a successful combination of *hardware* (material equipment), *software* (knowledge) and *orgware* (organisational and institutional conditions).
Frascati Manual (OECD, 2002b)	Technological innovation activities are all of the scientific, technological, organisational, financial and commercial steps, including investments in new knowledge, which actually, or are intended to, lead to the implementation of technologically new or improved products and processes.
Oslo Manual (OECD, 2005)	Besides the former definitions, this broader one includes organisational and marketing innovations.
Drucker (cit in Shavinina, 2003)	*"Innovation is the change that creates a new dimension of performance".*
Herkema (2003, p.341)	*"Innovation is defined as a mentality that expresses itself through learning. (…) is a knowledge process aimed at creating new knowledge and geared towards the development of commercial and viable solutions".*
Plessis (2007, p.21)	Innovation is defined as *"the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services."*
Baregheh et al. (2009, p.1334)	*"Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace."*

Source: own construction based on the referred authors

Lundvall (1992) stresses the role of "learning" and "knowledge" as key features in the innovation processes. Innovation is conceptualised as learning, as it is the novelty in the capabilities and knowledges which make up technology. Innovation, therefore, results from processes of learning, searching and exploring, reflected in the appearance of new products, techniques, forms of organisation, institutional changes and markets. Similarly, Feldman defends that "*Innovation,*

perhaps more than other economic activity, depends on knowledge" (1994, p. 1). Successful innovations result from the synthesis and combination of knowledge into new products, processes or services (Feldman, 1994; Luecke, 2002). Several authors directly correlate knowledge and innovation, highlighting the importance of knowledge creation and management as a vital element for the innovation process to occur (Herkema, 2003; Nonaka & Takeuchi, 1995; Plessis, 2007).

> *"Innovation is defined as the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services."* (Plessis, 2007, p. 21).

Smits argues that innovation *"(…) is a successful combination of hardware, software and orgware, viewed from a societal and/or economic point of view*" (Smits, 2002, p. 865). The author's idea follows the one depicted by Schumpeter (1934, 1942), Lundvall (1992) and Edquist (1997), that innovation results from the new combination of different factors or, according to Sundbo (1998b), the introduction of new elements or a new combination of old elements in organisations. The factors to which Smits refers to are: material equipment (hardware), different types of knowledge (software) and the organisational and institutional conditions that shape the development of an invention into an innovation, as well as its actual functioning (*orgware*). This definition is very close to the one on which innovation systems are based.

More recently, and in result of the study of several different approaches to innovation that match the dominant paradigm of the respective discipline, Baregheh et al. (2009, p. 1334) propose the following multidisciplinary and integrative definition of organisational innovation:

> *"Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace."*

3.2.1 Taxonomies of innovation

The multiplicity of approaches to innovation and the ambiguity of the concept lead to the necessity of deepen this analysis. There are different types of innovations, characterised by having

a different nature, different determinants and impacts. Therefore, according to Edquist (2001) it is necessary to classify innovations according to their distinct categories in order to identify their determining factors.

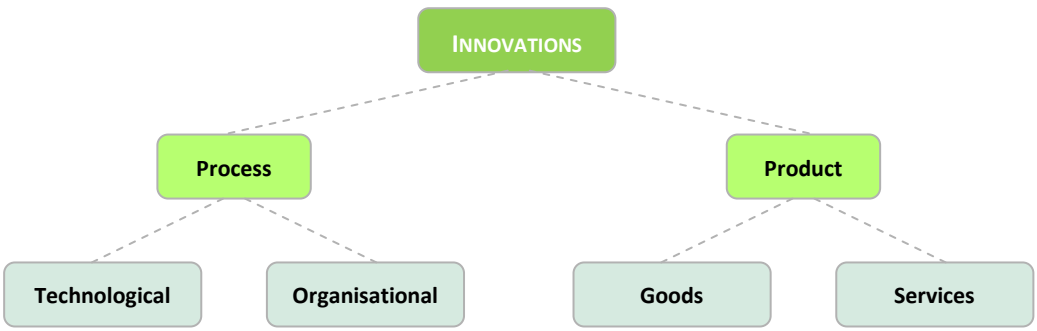
As seen before, Shumpeter (1934, 1942) already classified innovation according to five different types. His taxonomy embraced new or improved product, new method of production, new markets, new sources of supply or a new form of organisation.

More recent approaches have been studying this matter. For instance, Afuah (1998) presents a generic classification of innovation regarding its nature and divides it in:

- **Technological innovation**: it can be a product, a process or a service. Product and service innovations are new products or services intended to satisfy potential market's needs, while process innovation introduces new elements in operations used to produce a product or deliver a service.
- **Market innovation**: refers to new knowledge applied in marketing-mix: product, place, price, promotion, as well as to customer's expectations, preferences and needs.
- **Administrative innovation**: applied to innovations at organisational structure and administrative process level. Relates to strategies, structure, systems or people.

Edquist's (2001) classification focuses on product and process innovation. Accordingly, product innovations may be goods or services and it is, essentially, a matter of *what* is produced. On the other hand, process innovations concern *how* goods and services are produced, therefore, innovations may be categorised as technological or organisational.

Figure 3.1 - Edquist's taxonomy of innovations



Source: Edquist (2001, p. 7)

Utterback and Abernathy also approach innovation according to its nature. Innovations may occur in products or processes and are stimulated or constrained by a set of characteristics that vary with differences in the firm's environment and strategy. Process innovation occurs in the system of process equipment, work force, task specifications, material inputs, work and information flows; product innovation refers to a new technology (or combination of) introduced in order to meet the market's needs (Utterback & Abernathy, 1975).

More recently, and close to Schumpeters' definition, the Oslo Manual (OECD, 2005, pp. 47-51) classifies innovations into the four following types:

i. **Product innovations** – new or significantly improved goods or services with respect to its characteristics or intended uses;
ii. **Process innovations** – new or significantly improved production or delivery methods, including significant changes in techniques, equipment and/or software;
iii. **Marketing innovations** – new or significantly improved marketing methods involving significant changes in product design or packaging, product placement, product promotion or pricing.
iv. **Organisational innovations** – new or significantly improved methods in a firm's business practices, workplace organisation or external relations

Pavitt (1984) classifies innovations according to different sectoral groups and the flow of knowledge among them. The taxonomy was composed of four categories of industrial firms: the ***supplier dominated*** firms relate to traditional industries which usually innovate by acquiring machinery and equipment and rely on external sources in order to innovate. ***Scale-intensive*** firms are usually characterised by mass production industries that produce basic materials and consumer durables. Here, sources of innovation may be both internal and external. ***Science based*** enterprises exploit scientific discoveries to apply on new products and processes. They rely on R&D and knowledge from both internal sources and university research. ***Specialized suppliers*** are smaller and more specialized firms that produce technology to be sold to others. In a subsequent version, Pavitt et al. (1989) added a new category named **information-intensive** firms (banking, retailing, internet, software, etc. firms). These have their main source of technological accumulation in advanced processing of data. This new category has lead to the disappearance of specialized suppliers, as they are forced to become information-intensive or scale-intensive, or to become non-innovative. These typologies point to the necessary engagement in networks.

Traditional categorisation of innovation divides it into **incremental** or **radical,** focusing on the created impacts. Incremental innovations usually exploit already existing forms or technologies. Firms introduce minor changes to existing products, improving or reconfiguring it to serve other purpose. It often reinforces the growth of productivity and the dominance of existing firms and over time it may have significant economic consequences. Despite their importance, they may be unnoticed. On the other hand, radical innovations, frequently called as *breakthrough* or *discontinuous* innovations represent something absolutely new based on different scientific or technological principles. It opens up new markets and provides new applications. Radical innovations create significant difficulties for established firms and existing business models by destroying their competitive position (Ettlie, William, & O'Keefe, 1984; Freeman, Clark, & Soete, 1982; Freeman & Perez, 1988; Harvard Business School, 2003; Henderson & Clark, 1990; Nelson & Winter, 1982; Tushman & Anderson, 1986).

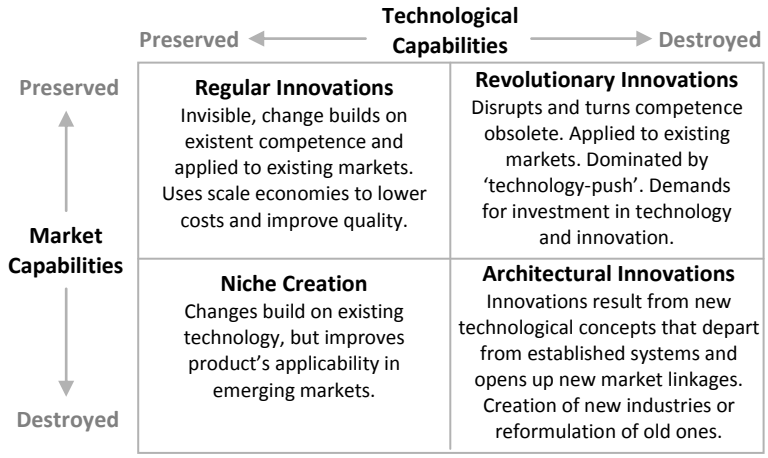
Radical and incremental innovations require different organisational capabilities. According to Ettlie et al. (1984), incremental innovation reinforces the capabilities of established firms, while radical innovations obliges them to create and utilise new technical and commercial skills and new approaches to problem-solving. Shumpeter's notion of *creative destruction*, in which innovations destroy the market position of firms whose products draw on old technology, may have inspired the concept of radical innovation. Chandy and Tellis (1998) complement this analysis by stating that incremental innovations usually do not provide incremental customer benefits (per dollar), while radical innovations provide substantially greater benefits, when compared to already existing products.

Incremental innovations occur in a continuous manner and usually result from inventions and proposals made by production people or by users. Radical innovations remain discontinuous events often resulting from R&D in firms, universities or government laboratories (Freeman et al., 1982). Mensch's (1979) research lead him to conclude that radical innovations appear mainly during periods of recession, a vision not supported by Freeman et al. (1982) who agree that radical innovations are particularly important for the growth of and penetration in new markets, although their economic effects only achieve significant importance when a whole cluster of radical innovations generate the rise of new industries and services.

Therefore, the authors go beyond and suggest two new types of innovations: ***new technological systems*** and ***changes of techno-economic paradigm*** (or technological revolutions). While the former refer to a combination of radical and incremental innovations in both products and processes, together with organisational and incremental innovations and affects several firms and economic activities, the later generate a major impact on the entire economy, creating a new range of products, services, systems, industries and sectors, as they are set on different clusters of radical and incremental innovations. Changes in techno-economic paradigm combine radical product, process and organisational innovation and rarely occur but when they happen, they bring along the necessary changes in the institutional, social and firm level framework (Freeman et al., 1982; Freeman & Perez, 1988).

Abernathy and Clark (1985) recognise that innovations may be neither radical nor incremental. They developed a taxonomy model categorising innovations in regard to market and technological capabilities which, depending on one of the four innovation types, can be both preserved or destroyed. The resultant four cell matrix is called the *transilience* map (combining the words transient and resilience) and demonstrates how different types of innovations can affect the competitiveness in a specific industry. Each quadrant/innovation type has its own competitive impact and demands for different organisational and management competencies[2] (Figure 3.2).

Figure 3.2– Abernathy-Clark Model



Source: Based on Abernathy and Clark (1985)

[2] This model was recently adapted and applied to Tourism by Hjalager (2002) and is presented in section 3.3.

In a similar approach, Tushman et al.'s discussion of technology cycles and innovation streams, also considers innovation types, considering the impact on *market knowledge* and *research and development/technology* (Figure 3.3). Market knowledge may new or already exist (corresponding to Abernathy and Clark's *preserved* and *destroyed* levels). The second dimension considers technological developments as *incremental* and *radical*. Innovation types result from the crossing of these conditions and may be: (i) *architectural*, when an incremental improvement in technology allows the creation of new markets; (ii) *major innovation* regards a radical change in technology and the creation of new markets; (iii) incremental, same markets with incremental improvement in R&D; and (iv) major process innovation, in which a radical change in technology exists, but markets remain the same (Tushman, Anderson, & O'Reilly, 1997).

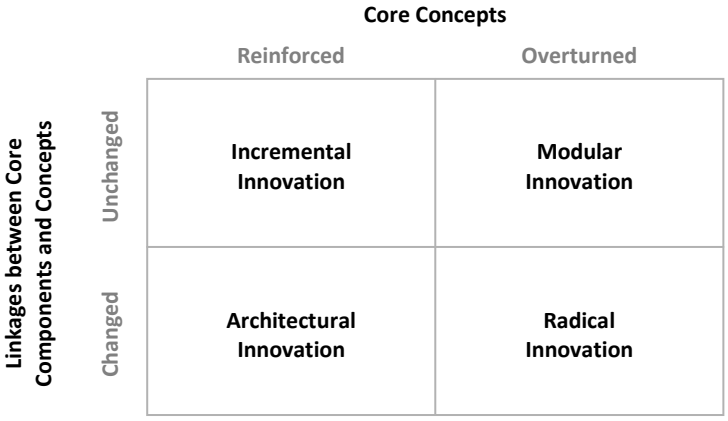
Figure 3.3– Tushman et al. Innovation Taxonomy Model

		TECHNOLOGY/ R&D	
		Incremental	Radical
MARKET	New	Architectural Innovation	Major product/ service innovation
	Existing	Incremental product/ service/ process	Major process innovation

Source: Tushman et al. (1997)

Drawing on the assumption that the traditional and dichotomised categorisation of innovation (incremental vs. radical) is incomplete and eventually misleading, Henderson and Clark analysed the knowledge that is necessary to innovate and divided it into two dimensions: knowledge on the components and knowledge on the linkage between these components – the architectural knowledge (Figure 3.4). The outlined framework classifies innovations according to two dimensions: the impact of innovation on components and its impact on the linkages between components. This model provides an analysis on "*(…) the impact of innovation on the usefulness of the existing architectural and component knowledge of the firm*" (Henderson & Clark, 1990, p. 11).

Figure 3.4– Henderson-Clark Model



Source: Henderson and Clark (1990, p. 12)

According to Henderson and Clark, incremental innovations are built upon existing component and architectural knowledge, that is, both of them are simultaneously improved. Oppositely, radical innovations establish a new set of core concepts personified in components that, when linked together, result in a new architecture. Modular innovation will require new knowledge on components, but architectural knowledge will remain unchanged, that is, will only change the core design concept. The opposite of modular innovation is the architectural innovation. Architectural innovation's essence lies on the *(…) reconfiguration of an established system to link together existing components in a new way*. The core concept behind each component (and all associated knowledge) will remain the same (Henderson & Clark, 1990, p. 12).

Figure 3.5 – Chandy -Tellis Model

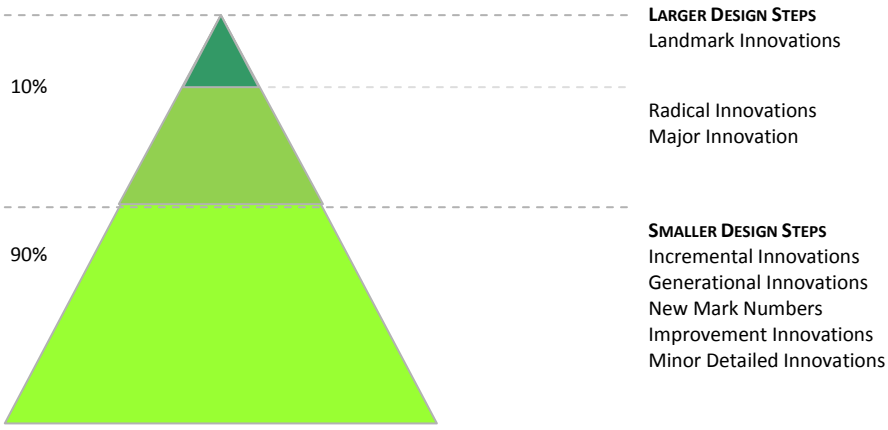
		Customer Need Fulfilment Per Dollar	
		Low	High
Newness of Technology	Low	Incremental Innovation	Market Breakthrough
	High	Technological Breakthrough	Radical Innovation

Source: After Chandy and Tellis (1998)

Chandy and Tellis' (1998) literature review lead them to conclude that there are two concepts that underlie most definitions and classifications of innovation: (i) technology, that is, to which extent the technology involved in a new product development is different from prior ones; (ii) markets, or to which extent the new product fulfils customers' needs better than existing products (on a per dollar basis). Accordingly, they advance a taxonomy set on four different innovation types (Figure 3.5).

Besides incremental and radical innovation (already defined on this chapter), the authors introduce two innovation types: ***market breakthroughs*** which are based on existing technology (or with minor changes), although providing substantially higher customer benefits; and ***technological breakthroughs*** that are set on substantially new technology, but do not provide additional customer benefits.

Figure 3.6 – Innovations according to technical change



Source: Rothwell and Gardiner (1988, p. 373)

Focusing on technological change, Rothwell and Gardiner (1988) state that even during periods of high technological change, radical innovations are not frequent. Alongside the appearance of a landmark innovation (the authors estimate they represent only 10% of innovations), several "new" products and/or industries will appear, although they are only redesigns of the original one (90% of innovations), as depicted in figure 3.6.

Innovation taxonomies reflect an abundance of classifications that often call different types of innovation by the same name, or the same innovations are classified in different manners. To sum

it up, Coccia (2006) organised some of the existent taxonomies in different levels or degrees, according to their economic impact and innovation intensity (Table 3.2).

Table 3.2 – Innovation taxonomies by innovation intensity and economic impact

Economic Impact	Innovation Degree	Innovation Intensity	Classifications of innovation
I SET Low Impact	1st	Lightest	Elementary or micro-incremental (Coccia, 2005) Unrecorded (Freeman, 1994)
	2nd	Mild	Continuous (Freeman et al., 1982) Improvements (Mensch, 1979) Incremental (Freeman et al., 1982; Priest and Hill, 1980) Market Pull (Dosi, 1988) Minor (Archibugi and Santarelli, 1989) Normal science (Khun, 1962) Regular (Abernathy and Clark, 1985)
	3rd	Moderate	Major (Archibugi and Santarelli, 1989; Rycroft and Kash, 2002) Market breakthrough (Chandy and Tellis, 2000) Modular (Henderson and Clark, 1990) Non drastic (Arrow, 1962); Gilbert and Newbery, 1982) Really new (Garcia and Calantone, 2002)
II SET Medium Impact	4th	Intermediate	Evolutionary Technical (Moriarty and Kosnik, 1990) Micro-radical (Durand, 1992) Niche creation (Abernathy and Clark, 1985) Non drastic (Arrow, 1962; Gilbert and Newbery, 1982) Technological breakthrough (Chandy and Tellis, 2000)
	5th	Strong	Architectural (Abernathy and Clark, 1985) Basic innovation (Mensch, 1979) Breakthrough (Tidd, 1995) Discontinuous (Archibugi and Santarelli, 1989) Discrete (Priest and Hill, 1980) Drastic (Arrow, 1962; Gilbert and Newbery, 1982) Fundamental (Mensch, 1979) Radical (Freeman et al., 1982) Technology push (Dosi, 1988)
III SET High Impact	6th	Very Strong	Clusters of innovations (Freeman et al., 1982) Constellations of innovations (Keirstead, 1948) Innovation systems (Sahal, 1981) New technological Systems (Freeman et al., 1982)
	7th	Revolutionary	Change of Techno-economic paradigms (Freeman et al., 1982) Change of technological paradigms (Dosi, 1982) Cluster of New technological systems (Coccia, 2005) Revolutionary (Abernathy and Clark, 1985) Technological regimes (Nelson and Winter, 1982) Technological revolutions (Freeman et al., 1982; Freeman, 1984)

Source: Coccia (2006, p. 15)

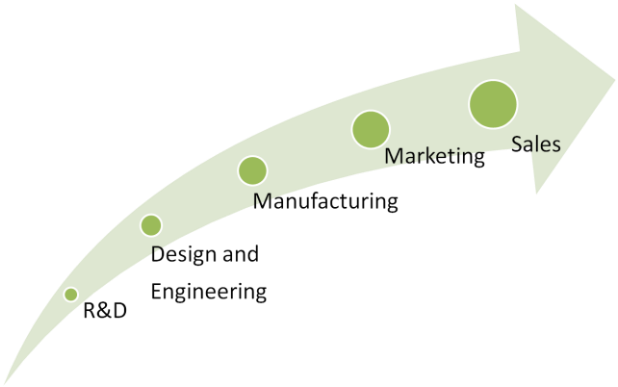
3.2.2 The evolution of the innovation concept

Although Schumpeter had, in his studies, advanced the idea that innovation and entrepreneurship are major sources of development and economic growth, this was mainly generalised during the 1950's, especially after Solow's empirical findings and the neoclassical growth model. Rothwell (1994) distinguished the existent models of innovation into five sequential generations. These models reflect the understanding and practice of the innovation process along the time.

First Generation: Technology-push | Linear | Neoclassical Model

The first generation innovation process prevailed since the Second World War, during the fifties until the mid-sixties. Socioeconomic context was of high economic growth, industrial expansion, emergence of technology-based new industries, rising prosperity and consequent consumer boom. Society and governments were, at the time, favourable towards science and industrial innovation, which were seen as potential sources of problem solving (Rothwell, 1994).

Figure 3.7 – Technology-Push Model



Source: Rothwell (1994, p. 8)

The 'technology-push' model (also called linear or neoclassical model) suggests that innovation occurs through a linear progression starting from science (or research), that leads to technological development, development leads to production and production to marketing and sales. Innovation was seen as a "*process of discovery in which new knowledge is transformed into new products via a set of fixed sequences or stages*" (Smith, 1994, p. 8, cit in Chaminade & Roberts, 2002).

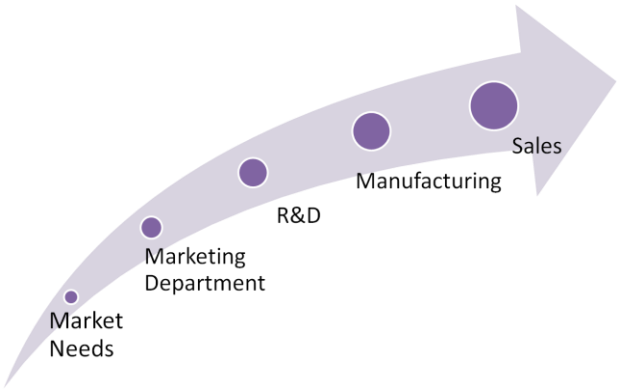
Research and development (R&D) was considered as the privileged source of innovation. Thus, an increase in R&D would result in the creation and commercialisation of more successful products and services. Innovation was then proactive to the market.

Kline and Rosenberg point out some limitations of this model, arguing that it "*distorts the reality of innovation in several ways*" (1986, p. 286). The authors claim that the lack of feedback paths within the innovation process prevents the evaluation of performance, the formulation of future guidelines and the assessment of the competitive position. Innovation process must include feedback information from sales, individual users, etc. Moreover, innovation requires not only accurate and rapid feedback, but also that this information results in suitable follow-up actions. Innovation prospers best when provided with multiple sources of information.

According to the same authors, the central point of innovation is not science, but design. The authors believe that the idea that innovation is originated by research is wrong most of the time and even when it occurs it must be aligned with market needs. Therefore, the consumers seem to be the primary source of innovation. Nonetheless, innovation is supported by science and the demands of innovation often compel the creation of science.

Second Generation: Market-Pull | Demand-Pull | Need-Pull

Figure 3.8 – Demand-Pull Model



Source: After Rothwell (1994, p. 9)

The second generation of innovation models, although still based on a linear set of stages seem to overcome the previous referred limitation as it considers the market as the source of innovation, rather than science.

By the mid 1960's, the economy was experiencing high competition and therefore, there was a strategic focus on marketing in order to increase companies' market share. In result, the innovation process started to change as the emphasis shifted from R&D to demand side factors. The second generation innovation model reflects this idea: market and consumers' needs provide the guidelines for the creation of new ideas and for R&D, which gains a merely reactive role on innovation process. This positioning lead firms to perform mainly incremental innovations, as they simply adapted already existing products to their customers evolving needs, and therefore loosing the ability to adapt to radical market or technological changes (Rothwell, 1994).

Third Generation: Interactive Model

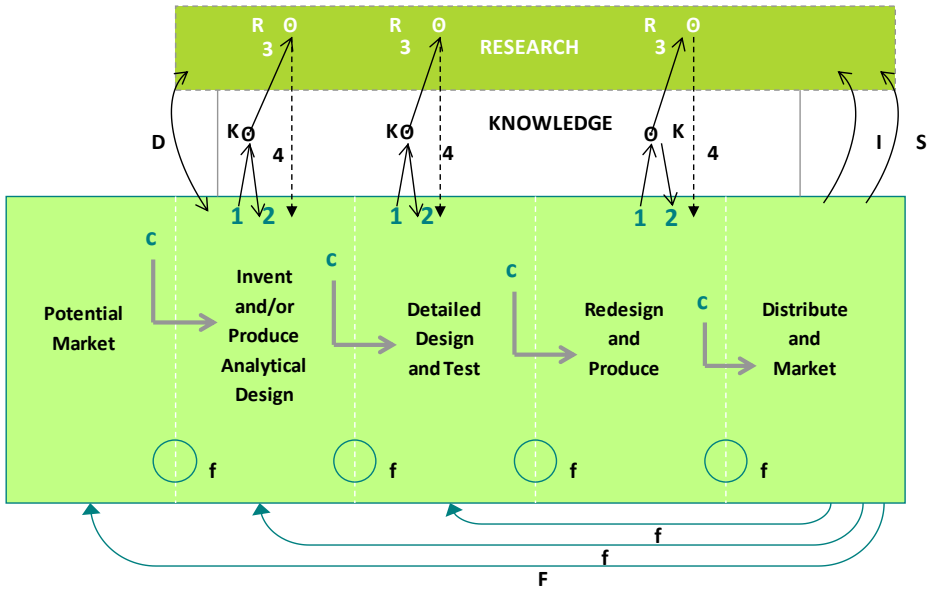
In response to the limitations of the previous linear models, Kline and Rosenberg (1986) developed an alternative called the "chain-linked model" (Figure 3.9) where innovation results from an interactive process within the firm. Its primary feature and main difference against previous models is that it does not consider only one major activity path, but five, moving away from linear constructs.

The first path (represented by C) is the central-chain-of-innovation. It begins with design and continues through development and production to marketing. Second path relates to feedback links (f and F) that repeat the steps and connect back from market needs and users in order to boost product and service improvement and performance (Kline & Rosenberg, 1986). These feedbacks represent the intensification of cooperation between different departments, as the interaction among several units is essential to innovation (Chaminade & Roberts, 2002).

The third path (arrow D and links 'K-R') represents the linkage between science and knowledge and the entire innovation process, as modern innovation is often not possible without knowledge, science and research. Although the authors do not consider science and knowledge as the initiating step of innovation, they believe that it is fundamental at all points along the central chain of innovation. When new science prompts radical innovations, one is facing major changes than can even create entirely new industries. This fifth and last path is represented by arrow D in

figure 3.9 and concerns to the feedback from the products of innovation to research and science (Kline & Rosenberg, 1986). The chain-linked model managed to combine two important types of interactions, crucial to innovation: the processes within a firm and the relationships between the firm and scientific knowledge.

Figure 3.9 – Kline and Rosenberg's Chained-Linked Model of Innovation

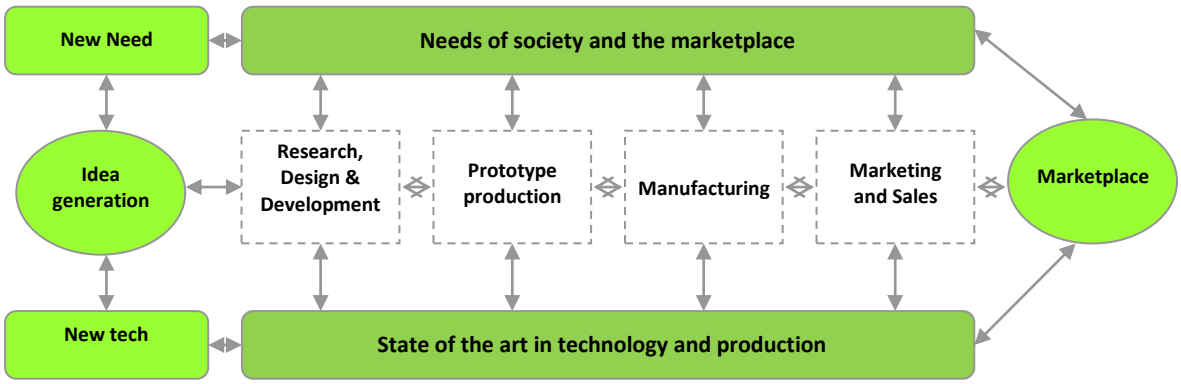


Source: Kline & Rosenberg (1986, p. 290)

Legend:
C: central-chain-of-innovation
f: feedback loops
F: particularly important feedback
K-R: Links through knowledge to research and return paths. If problem solved at node K, link 3 to R nor activated. Return from research (link 4) is problematic – therefore dashed line
D: direct link to and from research from problems in invention and design
I: Support of scientific research by instruments, machines, tools and procedures of technology
S: Support of research in sciences underlying product area to gain information directly and by monitoring outside work. The information obtained may apply anywhere along the chain

As stated by Rothwell (1994) the 1970's until mid-1980's was a period marked by high inflation, demand saturation (supply outstripped demand) and growing unemployment. The firms' focus was put on cost control and reduction. Therefore, it was crucial that their outputs were set on successful innovative products and hence that the bases of innovation were clearly understood. Consequently, a number of empirical studies on innovation process were published at the time, indicating that linear models were oversimplified and merely examples of a more comprehensive process of interaction between science and market needs.

Figure 3.10 – Coupling Model



Source: Rothwell (1994, p. 10)

The third generation interactive (coupling) model, also set on feedback loops (Figure 3.10), can be defined as:

> *"a logically sequential, though not necessarily continuous process, that can be divided into a series of functionally distinct but interacting and interdependent stages. The overall pattern of the innovation process can be thought of as a complex net of communication paths, both intra-organisational and extra-organisational, linking together the various in-house functions and linking the firm to the broader scientific and technological community and to the market place. In other words, the process of innovation represents the confluence of technological capabilities and market needs within the framework of the innovative firm"* (Rothwell and Zegveld, 1985, cit in Rothwell, 1994, p. 10).

The interactive coupling model was applied to several countries, sectors and firms of all sizes. However, significant inter-sectoral differences concerning the importance of the different innovation factors were identified. These can be divided into two groups, as stated in table 3.3.

Table 3.3 - Critical Innovation Factors

Project Execution Factors
▪ Good internal and external communication: accessing external know-how; ▪ Treating innovation as a corporate wide task: effective inter-functional coordination: good balance of functions; ▪ Implementing careful planning and project control procedures: high equality up-front analysis; ▪ Efficiency in development work and high quality production; ▪ Strong marketing orientation: emphasis on satisfying user needs: development emphasis on creating user value; ▪ Providing a good technical and spares service to customers: effective user education; ▪ Effective product champions and technological gatekeepers; ▪ High quality, open-minded management: commitment to the development of human capital; ▪ Attaining cross-project synergies and inter-project learning.

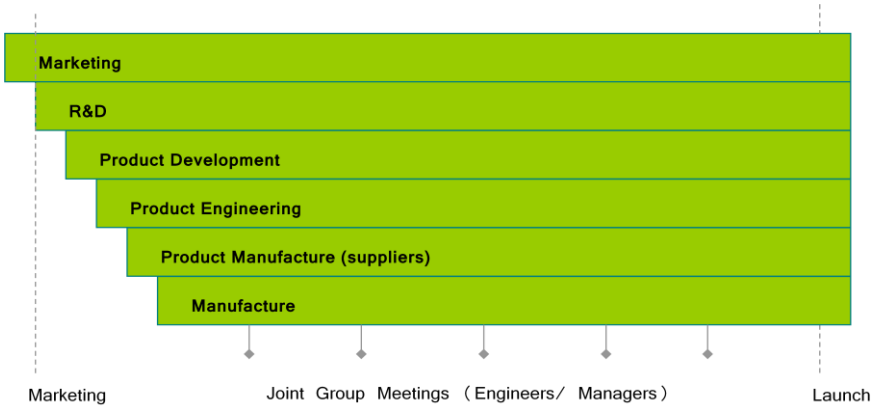
Corporate Level Factors
▪ Top management commitment and visible support for innovation; ▪ Long-term corporate strategy with associated technology strategy; ▪ Long-term commitment to major projects (patient money); ▪ Corporate flexibility and responsiveness to change; ▪ Top management acceptance of risk; ▪ Innovation-accepting, entrepreneurship-accommodating culture.

Source: Rothwell (1992; 1994)

Fourth Generation: Integrated Model

Despite of the advances of third generation models, these are still based on a sequential process, although integrating feedbacks of information among the different units involved. In the mid-1980's, Imai, Nonaka, and Takeuchi (1985) studied the new product organisation of Japanese firms. Japanese firms' vision of innovation leads to a change in the thinking about the process. The resultant integrated models were set on the processing of information in a parallel and simultaneous way (rather than linear) and a close integration of research, engineering, production, marketing, customers and suppliers in new product development, building cross-functional teams.

Figure 3.11 – Integrated Model



Source: Graves, 1987, cit in Rothwell (1994, p. 12)

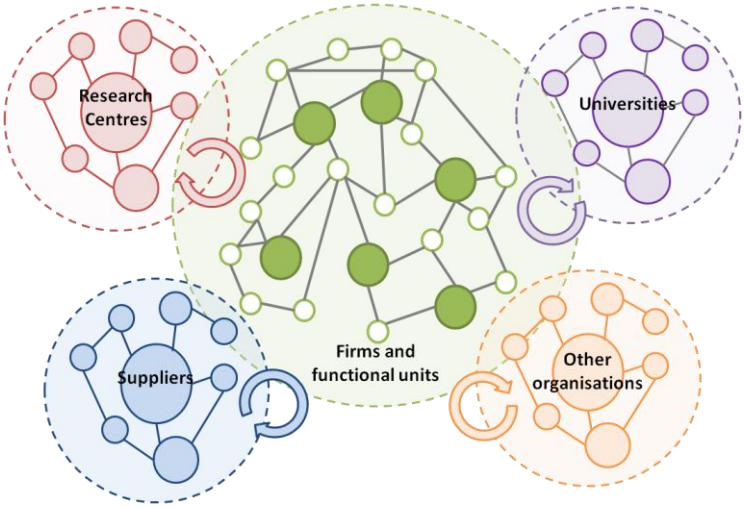
The features of Japanese firms' product development process, namely the *integration* and *parallel development,* allowed them to innovate more efficiently than their counterparts from Western

countries. The involved actors (customers, suppliers and company's functional units) worked together and simultaneously, rather than sequentially. Different activities overlap during the process, allowing the reduction of time and costs (Chaminade & Roberts, 2002). Imai et al. (1985) named it the *rugby approach*.

Fifth Generation: Systems Integration and Networking

Fifth generation models start moving to a concept set on the importance and relevance of networking. The idea is that, beyond the integration of firms' different functional units on the innovation process, they also need to reinforce their connections to users, suppliers and other organisations taking part on the system of innovation.

Figure 3.12 – Networked and Systemic Model



Source: own elaboration

In this networking approach it is defended that interaction and knowledge sharing are mandatory, especially those deriving from linkages with other sources of knowledge, such as firms, universities, research centres, users, suppliers, etc. (Chaminade & Roberts, 2002). Innovative companies strive to achieve speed, efficiency and flexibility of innovation activities. In order to do so, they should include integrated and parallel development processes (as observed in fourth generation models), vertical linkages, decentralized structures, an emphasis on the use of electronic tools in order to reinforce the overall linkages of the firm and an increase of horizontal

linkages: collaborative research, joint R&D ventures and R&D based strategic alliances. In the fifth generation innovation models, ICTs play a central role by promoting and improving internal and external links and facilitating the storage and exchange of information. Therefore, information exchange is now the central process in innovation (Rothwell, 1994). The main characteristics defining fifth generation models are the following:

Underlying strategic elements:

- Time based-strategy;
- Development focused on quality and other non-price factors;
- Emphasis on corporate flexibility and responsiveness;
- Customer focus;
- Strategic integration with primary suppliers;
- Strategies for horizontal technological collaboration;
- Electronic data processing strategies;
- Policy of total quality control.

Primary enabling features:

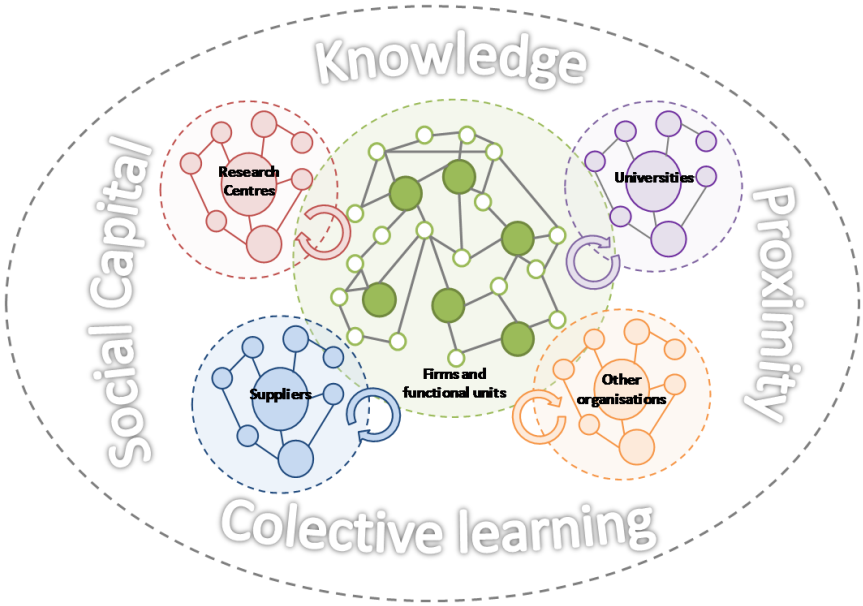
- Greater organisation and systems integration (cross-functional development process, involvement of suppliers and users, horizontal collaboration);
- Flater, more flexible organisational structures for rapid and effective decision making (empowerment of management and project leaders);
- Fully developed internal databases (data sharing systems, electronic assisted product development);
- Effective external data link (linkages to suppliers and customers through electronic tools and effective data links with R&D collaborators).

Sixth Generation: Knowledge and Connectivity | Collective Learning

Despite the fact that information and data are necessary in innovation process, there are other types of knowledge, more tacit, that lead to a new generation of innovation models. Chaminade and Roberts (2002) place the emphasis in fast learning as the major source of competitive advantage. The creation, acquisition, transfer, integration and deployment of knowledge arise as the focus of several management knowledge-based theories, especially during the nineties, which

had a significant impact on innovation theories and models. Networking and integration processes, emphasised by fifth generation models, continue to be key issues on innovation. However, in contrast to the previous model, where data exchange through ICT was considered to be the main feature, sixth generation models focus on the mechanisms that promote the creation, expansion and utilisation of all knowledge types. The sixth generation innovation model is based on knowledge (as opposed to information) and connectivity (as opposed to explicit formal networks).

Figure 3.13 – Knowledge, Networking and Collective Learning Model



Source: own elaboration

Knowledge is understood as the most important resource for innovation, as "*the more innovative and competitive firms are the ones who are able to create, maintain and use their knowledge resources effectively allowing the firm to learn collectively*" (Chaminade & Roberts, 2002, p. 11). Knowledge resources can be either internal (intellectual capital) or external (social capital). In this context, tacit knowledge is considered to be a main asset of firms. According to Polanyi (Polanyi, 1966) tacit knowledge tends to be personal, context-specific, hard to formalize and communicate and includes cognitive and technical elements, while specific (or codified) knowledge is transmittable in formal language. Nonaka and Takeuchi (1995) characterise tacit knowledge as subjective and incorporating the knowledge of experience, simultaneous and analogue

knowledge, while explicit knowledge is objective, rational and sequential. Proximity is this fundamental to assure that tacit knowledge is effectively transferred.

Table 3.4 – Main Features of the 6th Generation Innovation Model

Underlying Strategic Elements	Primary Enabling Features
▪ Time and space compression ▪ Focus on intangibles as the main source of value of the firm (such as tacit knowledge) ▪ Emphasis on connectivity ▪ Stakeholders at the forefront of strategy ▪ Strategic integration with competitors ▪ Focus on tacit knowledge	▪ Flexible structures and mobility of resources ▪ Effective internal and external knowledge-sharing mechanisms ▪ Top-management involvement ▪ Culture and language ▪ Externally bridging institutions ▪ Mechanisms for the identification, measurement, management and disclosure of information on intangibles

Source: Chaminade & Roberts (2002)

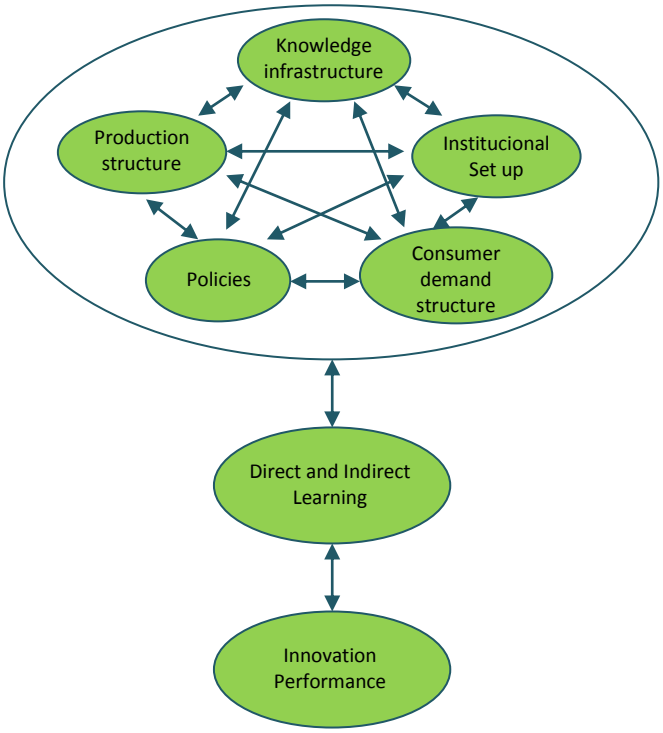
Tacit knowledge is hard to imitate, capture and to transmit. It is embedded in people (human capital), organisation (structural capital) and its networks (relational capital). It is related to the firm's learning ability and is acquired through "*learning-by-doing"*, "*learning-by-using"* and *"learning-to-learn"* being, therefore, closely related to a firm's ability to innovate. On the basis of the creation of the 6th generation innovation model lays the idea that innovation is about learning collectively and at two levels in simultaneous: within the firm, connecting the different sources of knowledge and across firms, through the creation of networks (Chaminade & Roberts, 2002).

The previously presented innovation models conceptualise innovation at the firm (or production) level. However, innovation concept has gone through severe evolutions, as it gradually started to abandon the linear perspective and began to be understood as an interactive and integrated phenomenon (namely with the chain-linked model developed by Kline and Rosenberg, 1986). As stated by Cooke and Morgan (1998, p. 17), "*the wider environment of the firm – the social and political system in which it is embedded and with which it interacts – can play a vital role in facilitating (or frustrating) its learning capacity*".

This line of though emphasises that innovation is a process socially and institutionally embedded and doted of a systemic nature. Furthermore, and as noted by Fagerberg (2006, p. 4), firms rarely innovate in isolation, since innovation *"results from continuing interaction between different actors and organisations*", which highlights the fundamental role of networks and inter-firm

relationships. These relationships among economic agents are fundamental for knowledge creation and transfer and collective learning, crucial elements of systemic innovation (Gregersen & Johnson, 1997; Lundvall, 1992), as seen in figure 3.14. These dimensions are on the basis of the territorial innovation models analysed further on this chapter and partly explain why organisations agglomerate in order to innovate.

Figure 3.14 – Main factors affecting innovation in a System of Innovation



Source: Gregersen and Johnson (1997, p. 484)

3.3 Innovation in tourism

Similarly to services in general, research on tourism innovation is still moderate, both at theoretical and empirical levels. However, there have been a growing number of studies bringing important insights and findings on innovation in tourism businesses, such as hotel and tourist attractions, at destination level or about the need for tourism innovation policy and planning for destination competitiveness (Bieger & Weinert, 2006; Carson & Macbeth, 2005; Grant, 2004; Hall, 2009, among others; Hall & Williams, 2008; Hjalager, 2010; Hjalager et al., 2008; Jacob, Tintoré,

Aguiló, Bravo, & Mulet, 2009; Laws, 2009; Mattsson, Sundbo, & Fussing-Jensen, 2005; Novelli, Schmitz, & Spencer, 2006; OECD, 2006; Orfila-Sintes, Crespí-Cladera, & Martínez-Ros, 2005; Paget, Dimanche, & Mounet, 2010; Peters & Pikkemaat, 2005; Sørensen, 2007).

Taxonomies and general definitions of innovation have been approached and it was concluded that classifications are needed in order to understand determinants, features and processes underlying innovation (Edquist, 2001). It was also presented Schumpeter's conceptualisation on this matter, appearing to be the basis over which more recent taxonomies were subsequently developed. It may be useful to recall that Schumpeter differentiated invention (a new idea), from innovation: a new good, new method, new market, new source of supply or a new form of organisation, leading to or involving a commercial application (Schumpeter, 1934).

Hall (2009) complies with the four taxonomies presented in the Oslo Manual (OECD, 2005) distinguishing between product, process, organisational and marketing innovations. Hjalager's proposals align with this classification, although the author tries to embrace additional categories, namely: institutional innovation, reverse community innovation and reverse business innovation, as presented in table 3.5 (Hjalager, 1997, 2010; Hjalager et al., 2008).

Despite the fact that the proposed categories bring important insights on innovation in tourism (although they can be also applied to other industries), for the purpose of this work and regarding the possibility of a further comparison with other studies and/or business sectors, it is considered the general taxonomy proposed by the Oslo Manual (OECD, 2005), used in the Community Innovation Survey and that match the four first categories presented in table 3.5. Innovation is distinguished according to its nature regarding if it is a product, process, organisational or marketing innovation. Institutional innovations refer to the creation of networks and/or alliances, which falls under organisational innovations according to the definition proposed by OECD (2005). The importance of the social dimension of innovations, that is, that the benefits deriving from innovation should have a positive impact on society is present in the last two categories: reverse community innovation and reverse business innovation. Notwithstanding, these categories classify innovation regarding its impacts, and not its nature, as the previous ones. This analysis is extremely important, although it is not related to the objectives of this research and therefore these concepts are not used in the empirical work.

Table 3.5 - Taxonomy of tourism innovations

Category	Definition
Product or Service Innovations	New product or service, to the market, to the firm or to the destination. They are usually perceptible to tourists and may represent the main factor of attraction or the decision to travel for a specific location. Examples: Low Cost Hotel, new wellness facilities, new attraction in a destination, changes in dimensions such as gastronomy, animation, etc.
Process Innovations	Refer mainly to backstage operations. The goal is to increase efficiency, productivity and flow. Although they are not visible to the customer, they are perceptible and therefore add value to the product or service. ICT support most of process innovations in tourism. Ex.: ICT implementation in airports to ensure mobility of people or luggage, food service technologies in restaurants, information transfer and management applications, crowd control devices in attractions, automatic check-in systems, CRS (computer reservation systems).
Organisational/ Managerial Innovations	New ways of organising internal collaboration, directing and compensating workers, building careers, improving workplace satisfaction, promoting internal knowledge. Ex.: employees training, building team spirit (team building techniques), managing customers' attitudes.
Marketing Innovations	New marketing concepts, new communication strategies, change in the way communication is made with customers, new forms of relationships with customers. Ex.: Loyalty programs, social media and internet as a new form of communication, electronic marketing and sales, co-creation of new brands (wine and tourism), implementation of CRM (customer relationship management)
Institutional Innovations	Go beyond the organisation to represent new collaborative or organisational structures or legal framework enhancing tourism businesses, such as networks, alliances or the creation of new institutions. Ex.: Certification entities, social tourism organisations, engagement in a tourism business association.
Reverse community innovation	Innovations that bring benefits to the local residents. Ex.: The launching of a new tourist facility, such as a hotel, that will promote the restructuring of a local industry (fishing, farming, handcraft), a new attraction that will reduce seasonality and therefore allow full year employment, prevent decline in population numbers, improve of quality of live, preserving natural and cultural resources.
Reverse business innovation	Innovations that bring benefits to other businesses. Ex.: A Wellness and spa facility with positive impacts on local medical centres; ski tourism that increases the local production of ski equipment.

Source: own elaboration based on Hjalager (1997); Hjalager (2010); Hjalager et al. (2008)

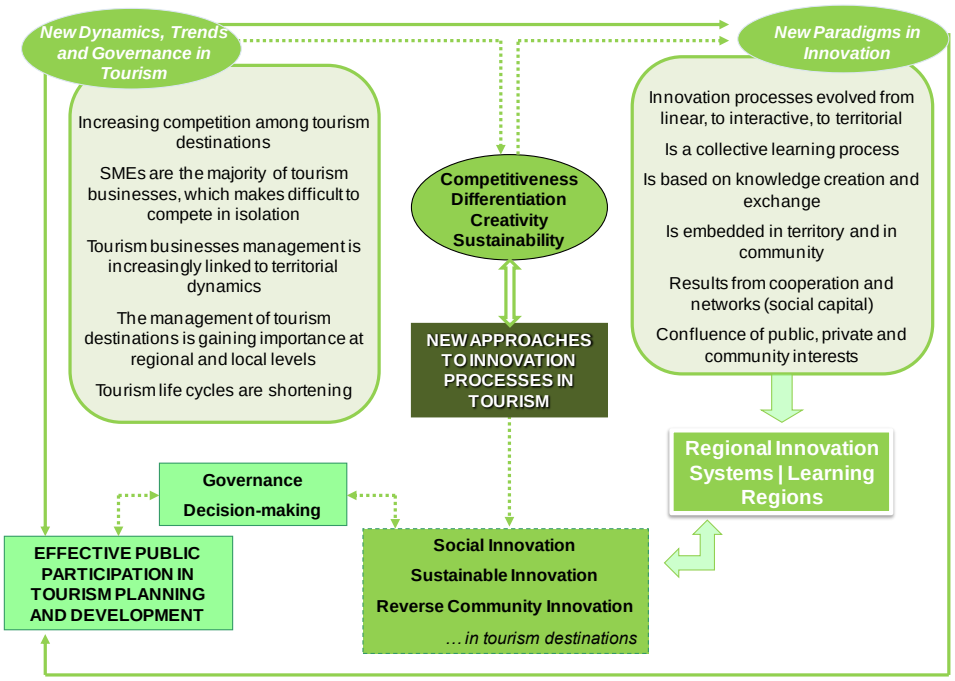
Apart from the fact that categorisations are necessary and provide important concepts in order to distinguish between different innovation types, as well as to identify the determinants and mechanisms that lie beneath each of them, it is recognised that sometimes innovations are developed together and therefore difficult to classify. Few service firms implement only one type of innovation, instead, they carry out product, process and organisational innovations at the same time, as they are frequently interrelated (Evangelista & Savona, 1998; Weiermair, 2005). For instance, a service innovation is often attached with a process innovation, or the introduction of an ICT application in order to develop a marketing innovation also implies a process innovation.

The categories "reverse community innovation" and "reverse business innovation" draw attention to an important issue regarding territorial innovation and tourism, which is the need to bring local communities and businesses into tourism innovation processes. Only this way they can identify themselves with the development of tourism destinations, on one hand, and benefit from the positive impacts and opportunities deriving from it, on the other. This so called "social innovation" develops within the framework of territorial innovation models (analysed further in detail), and should be institutionally and spatially embedded, as they arise according to local community dynamics, norms and institutions (Moulaert, Martinelli, & Swyngedouw, 2005). It is thus necessary to empower local residents as part of tourism innovation and development dynamics by encouraging bottom-up and decentralised governance practices, transferring macro-economic leverages to the benefit of regional territories, create joined-up solutions, developing networks of local stakeholders and assure the flow of communication among all individuals and groups (MacCallum, Moulaert, Hillier, & Haddock, 2009; Mulgan, 2006; Rodríguez, 2009)

In tourism destinations, social and sustainable innovations also require new planning, management and organisational structures, more embracive of local resources, local community's collective interests and quality of life and involving practices oriented towards forms of sustainable development. In order to achieve this, tourism management and development organisations should entail processes where society is called in to perform an active role to design the destination's future, and should also implement the necessary mechanisms that assure that local residents and businesses benefit from tourism. Accordingly, strategies of tourism development and planning should search for innovation in governance relations between local/regional tourism destinations and local stakeholders (rather than shareholders) (Costa &

Brandão, 2011). In this context, strong local innovation networks perform a significant role and may act as a tool to assure the implementation of these assumptions (Figure 3.15).

Figure 3.15 – Framework for public participation as social innovation in tourism

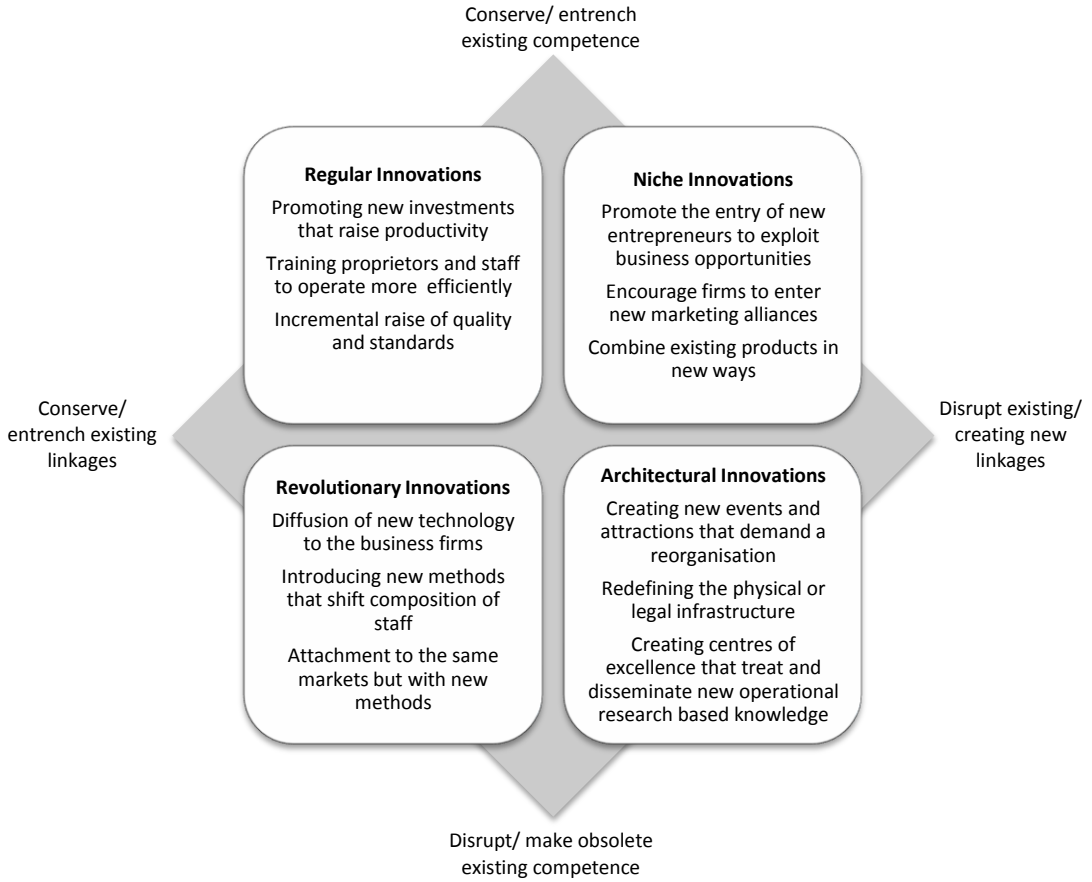


Source: Costa and Brandão (2011, p. 7)

Based on the Abernathy-Clark model, Hjalager (2002) provides a different perspective regarding innovation taxonomies (Figure 3.16). As previously referred, four different innovation types are identified in this model, according to the preservation or destruction of market linkages and technological capabilities (Abernathy & Clark, 1985). Architectural innovations are the ones presenting the higher impact, in the sense that they have the ability to disrupt existing linkages and knowledge and to create a new set of structures that may affect an entire society. They are very proximate to what Schumpeter defined as 'creative destruction' (Schumpeter, 1934), or to Thomas Kuhn's 'scientific revolution' concept (Kuhn, 1996, 1962). Tourism innovations falling under this category tend to change the concept of tourism and may relate to: the exploitation of a new resource (such as Arctic tourism); the redefinition of economic and urbanisation models on which tourism development is based (for instance, the prohibition of construction of new tourism facilities along the coast line demands for the redefinition of a new model of tourism development for the destination); the creation of different ways for accessing knowledge in

centres of excellence. This will demand for the investment and development of tourism research and the creation of knowledge networks that promote the dissemination of new knowledge to all tourism agents (Hjalager, 2002).

Figure 3.16 – Tourism perspective on Abernathy-Clark model



Source: Hjalager (2002, p. 467)

Revolutionary innovations keep external linkages unchanged but have a radical impact on existing knowledge by making it obsolete, which can affect an entire industry or sector due to a change in required skills and competences. Examples of revolutionary innovations may range from new technological applications that change the way of doing things within firms and organisations, to new distribution and marketing methods (e.g.: electronic marketing and sales will change the necessary competences, but eventually maintain the same targets). Conversely, niche innovations will demand for new external structures (new markets, new collaborative structures) but no new knowledge or competences are necessary. They include, for instance, new business firms in a tourism destination to increment tourism supply; marketing alliances in order to enter in new

market segments; combinations of existing products in different and innovative ways. Finally, regular innovations (or incremental innovations) are the least radical, as they do not demand for new knowledge and develop over the existing linkages. Examples range from new tourism facilities (ex.: hotel with new features); staff training resulting in an improvement of service or in added value; improving quality of tourism facilities or services (Hjalager, 2002).

Bonetti, Petrillo, and Simoni (2006) comment on a set of relevant issues for regional tourism innovation that academics and practitioners should be aware, namely:

i. The relevance of **incremental innovation** for regional tourism, requiring patience, long-lasting relationships and a long-term strategic view;
ii. Disequilibrium and rupture are sometimes of great value, as regions can find creative ways of making innovation work in face of adversity;
iii. **Knowledge is the most valuable asset**, as well as the ability of regions in using knowledge to innovate. There should be effective and efficient systems of collecting, storing and disseminating information in order for it to be used;
iv. **Institutional, physical** and, one may add, **knowledge infrastructure** (universities, higher education institutes and research centres) foster or constraint the ability to innovate. Often, regional agents ambition to innovate in tourism is limited by lack of resources (physical, financial, human, new knowledge) and strong governance structures;
v. **Social, political and cultural capital** (SPCC): social capital results from trust and cohesiveness of a network of stakeholders. This group should, however, be willing to attract new stakeholders and fresh knowledge. Tourism not only relies on strong social, political and cultural capital to foster innovation; a tourism development that is adequate to the region can itself foster and strengthen SPCC.

3.3.1 Determinants and barriers of tourism innovation

Some authors appear to believe that globally, tourism industry has a low innovation rate (Hjalager, 2002), possibly due to the fact that radical innovations (which are more perceptible) are unusual when compared to incremental ones (Peters & Pikkemaat, 2006) or that process and

organisational innovations are more common than product innovation (Pikkemaat & Peters, 2006)[3] and may not be considered or perceived as an innovative practice.

Peters and Weiermair (2002, cit in Mayer, 2009) argue that there are specific reasons explaining the low innovation rates in tourism industry. A first motive may be related to the demand side: mass tourists (Plog's mesocentrics) are conservative and consume simple and similar products, which may annul firms' orientation towards innovation.

Another issue relates to the size of tourism firms, which are mainly micro and small enterprises that, when innovate, assume costs and risks perceived as high for small companies. In result, propensity to innovate is positively correlated with the size of firm, a situation documented in many studies. For instance, Jacob et al. (2009) confirmed that in Balearic Islands, small firms innovate less than larger firms (3,67 innovations per small firm vs. 10 innovations per large firm). The size of the firm also influences the type of innovation, frequently limited to the acquisition of hardware with the objective of increasing internal capacities (Peters and Weiermair, 2002, cit in Mayer, 2009). This complies with the findings of Schumpeter (Mark II), that is, that large companies innovate more than small because they are engaged in internal R&D and accumulate stocks of knowledge that improve their competitive advantage. Bearing this in mind, Rønningen (2010) highlights the importance of tour operators and distribution channels for small tourism firms engaged in collaboration with this type of players, as they can provide access to markets and resources (such as technical and technological, knowledge and competencies) that would otherwise be inaccessible. This process qualifies itself as an innovation (marketing and organisational), but also prompts innovation by transferring new knowledge and resources that can be used by small firms in a creative way.

An important issue derives from the characteristics of human resources employed in tourism firms. Managers and employees frequently present low levels of education and training, or have degrees in areas not related to tourism. This may lead to a lack of capacity and skills to create and use knowledge towards tourism innovation. For instance, data from Portuguese Tourism Satellite Account (Instituto Nacional de Estatística [INE], 2011) informs that, in 2007, out of the 410.873 people that work in tourism characteristic activities, only 7,4% have a higher education degree,

[3] These conclusions were drawn by the authors from a study on innovation in small and medium sized hotels and therefore should not be generalised to the entire tourism industry.

while the majority (67,5%) only completed elementary education. This situation can potentially hamper the absorptive capacity of tourism firms and subsequently constrain innovative capacity.

A recurrent obstacle relates to the high possibility of an immediate imitation of a new product or service (Hall & Williams, 2008). In tourism (as well as in services in general), innovations are highly visible and rather simple as they do not involve advanced technology (Sundbo, Orfila-Sintes, & Sørensen, 2007). Furthermore, most innovations emerging in tourism cannot be patented (Poon, 1993). This makes competitors extremely aware of every new ideas implemented within the industry. What initially was seen as an investment made by the tourism business, may promptly be transformed into a high cost that is not only financial, but also with impact in market share and business image.

In their study on innovation in tourism in Balearic Islands, Jacob et al. (2009) concluded that the main obstacles to innovation were mainly internal to the firm. The lack of skilled personnel and the resistance to change within the firm were pointed as very significant obstacles by respectively 45% and 30% of the inquired firms. External motives, such as the lack of financing and regulation-related barriers appear in 3rd and 4th places being referred by 20% of firms, each. Elevated costs of innovation were only considered as a barrier by 10% of tourism businesses.

Finally and more closely related to the topic of this research, is the fact that many tourism enterprises are not involved in networks, partnerships or alliances, presenting low levels of cooperation. This atomistic form of operating in the tourism industry (and destination) hampers knowledge transfer and collective learning, necessary conditions for innovation to develop within a system. When tourism organisations are engaged in collaborative structures such as networks, innovative capacity and performance strongly increase (Bergin-Seers, Breen, & Frew, 2008; Hjalager et al., 2008; Macchiavelli, 2009; Novelli et al., 2006; Rønningen, 2010; Sundbo et al., 2007). Tourism industry is characterised by intense competition which forces firms to engage in constant innovations. However, cooperation is also a characteristic of tourism that strongly relates to its spatiality, that is, firms cooperate in order to obtain competitive gains at destination level. Within this context, cooperation with other destinations will also positively influence competitiveness.

Contrarily to the overall idea that tourism firms present a low innovation performance, the study conducted by Jacob et al. (2009) concluded that there was an average of 7,1 innovations per firm, being 55% considered as highly or moderately innovative and 45% less innovative (presenting less than 5 innovations). Several other important aspects can be drawn from this work:

- Within tourism sub-sectors, accommodation is the most innovative: average innovation per accommodation firm is almost the double of restaurants, that occupy the 2nd position (14 vs. 7,5, respectively);
- Process innovation is more frequent (46,5%) followed by organisational changes (37,3%);
- Globally, product innovation is not very frequent, although it is relevant in the accommodation sector;
- Technological innovations appear to be more frequent than non-technological changes. Within technological innovations, 81,6% are ICT related;
- Regarding information sources for innovation, all inquired firms referred the managers as very important, followed by the clients (35%), the firm staff (15%) and the competitors (10%).

But what are the characteristics and behaviour that a tourism firm should adopt in order to be innovative? Innovation requires that organisations are specifically designed for that purpose and that include certain components that are completely different from operating organisations. While the later focus on the efficiency of production, innovating organisations must be designed for doing something for the first time, which demands for different features (Galbraith, 1982).

In a study developed by Bergin-Seers et al. (2008) on the determinants and obstacles affecting innovation management in tourism SMEs it was concluded that innovative firms highly value information, which makes them to continuously scan the environment. An important conclusion was that the most innovative group of firms used networking to be updated of the advances in other business sectors as a way of developing new products and services. Finally, managers and a dynamic management style perform a key role in making firms more innovative.

Therefore, in order to be innovative, firms must have specific management processes and activities continuously creating an environment inside the organisation that stimulates innovation, such as the existence of an entrepreneurial leadership promoting individual creativity and innovation competencies in human resources; the acquisition of human capital, knowledge

and know-how and the development of appropriate internal management and control processes in order to create competencies for innovation; human resource strategies aligned with innovation and change within organisations (Peters & Buhalis, 2008).

Hjalager (2010) considers that are three different theories that explain the drivers of innovation in tourism firms. The first one is inspired by Schumpeter and highlights the role of entrepreneurship. Science and technology also play a key role as driving forces of innovation, as observed in the first model of innovation (the linear or technology-push model). However, market forces should be considered as well, as global economic and political issues may influence innovative behaviour. Nonetheless, clients and customers seem to be the most important input providers of innovation in this context. Here, the demand-pull or need-pull model is suitable. Finally, the role of innovation systems is approached. When organisations are physically proximate and engaged in networks, knowledge, information and new ideas are rapidly exchanged. Collective learning occurs more easily and the potential for innovation increases. Furthermore, innovation systems bring together public and private sector organisations in joint ventures and help to improve their communication channels, which may subsequently increase the support provided by public entities to the innovative efforts of private firms.

While attempting to understand the innovative behaviour of tourism enterprises at firm, network and system level, Sundbo et al. (2007) concluded that the size of firms is correlated with innovation rates, as already mentioned. Large firms are thus more innovative, as well as the ones participating in chains, groups or networks and the ones who employ professional management tools (training, business plans, academic employees, etc) in their operations. Tourism firms attracting active customers (with cultural or sport interests) are also more innovative. An interesting finding relates to the period along which the firm operates: businesses that operate more than six months per year are more innovative, as they create new and different products to attract clients in low season. The authors also concluded that firms belonging to an innovation network present higher innovation rates.

Table 3.6 – Determinants of innovation in tourism firms

Determinants of Innovation	
Structure	▪ Flat, dynamic and simple structures are more favourable to innovation than complex and bureaucratic structures. ▪ Essential elements in the structure of an innovative firm: *Roles*: idea generators, sponsors, orchestrators; *Differentiation*: innovative organisation separated from operating organisation; *Reservation*: existence of organisational units (R&D) entirely dedicated to innovation development.
Size	Large companies innovate more than SMEs. Tourism SMEs lack time, money and knowledge to engage in innovative activities and are subject to imitation. In order to overcome this, tourism SMEs should engage in networks, once that this way they can gain dimension, a stronger competitive dimension and easily access resources that would otherwise be unavailable to them (e.g.: knowledge, information, etc.).
Management processes	▪ Acquisition of human capital, knowledge and know-how; ▪ Development of management processes that transform knowledge and know-how into competencies for innovation; ▪ Human resource strategies consistent with innovation and organisational change; ▪ Dynamic and entrepreneurial leadership; ▪ Recognition of the high value of information leading to a constant monitoring of the environment; ▪ Development of professional management tools: human resources training plan, business plan, measurement of customer's satisfaction; ▪ Funding of innovation activities; ▪ Getting and blending ideas; ▪ Transitioning of the innovation from an 'idea' to the operating part of organisation for implementation; ▪ Managing programs to implement new products/ processes within firm's divisions; ▪ Reward system that compensates innovators.
Demand	▪ Motivations, expectations, needs and wants of clients and customers are important driving forces of innovation. ▪ Different clients demand for different innovative behaviour of firms: psychocentric tourists are conservative and not interested in newness. Firms serving this type of customers might not be oriented towards innovation. On the contrary, firms attracting active tourists (allocentrics) are more innovative and dynamic.
People/ Competencies	▪ Entrepreneurship, creativity and innovation competencies must be present at all levels of organisation; ▪ Selection of people with innovation competencies and appropriate educational level; ▪ Training and development of employees for innovation; ▪ Assure that the firm has absorptive capacity (capacity to learn and assimilate external information and apply it by developing innovations), which will depend on human resources' educational level and training.
Market forces	The high competition in tourism industry and the imitation effect makes that firms should be constantly innovating in order to be competitive.
Sources of knowledge	There are several sources of knowledge that can prompt innovation: clients or customers, R&D, suppliers, competitors, conferences, trade fairs, scientific or technical publications. The more diverse the knowledge sources of a firm, the more innovative it will be.
Cooperation	Cooperation with other local tourism firms, with other tourism destinations, with firms from other business sectors. Cooperation towards innovation increases the strength of SMEs, reduces the uncertainty and risk, and increases competitiveness. Firms engaged in cooperation access to more and diversified knowledge and are more innovative. Regional Innovation Systems play an important role within this context.

Source: own elaboration based on Macchiavelli (2009), Bergin-Seers et al. (2008), Galbraith (1982), Sundbo et al. (2007), Peters and Buhalis (2008), Hjalager (2010), Martínez-Ros and Orfila-Sintes (2009)

Especially important in the context of tourism innovation determinants and barriers is the fact that tourism destinations are location-specific, made of natural, cultural and man-made resources hardly transferable to other location. In this context, **regional innovation systems**, due to their characteristics, are of significant importance for innovation at destination level because territorial specificities will determine the intensity and type of innovation, engagement in innovation networks, knowledge creation and transfer.

Spatial fixity is referred by Urry (1990) as a central characteristic of tourism. It means that what is consumed by tourists is actually the place where the product is located. This implies that the tourist experience is understood as the overall destination, including attractions, public goods (such as landscape, beaches, etc.), tourism businesses, as well as the management of the destination by private and/or public organisations (DMOs). This particular feature of tourism will naturally determine and influence destination-level innovation (Hall & Williams, 2008), as it is associated with the clustering of activities based on mutual interdependencies that can foster tourism innovation. On one hand, the agglomeration of inter-related activities makes innovation more visible for customers, but also to competitors, which will make imitation more frequent. On the other hand, the agglomeration effect creates the potential for strong relationships of collaboration, knowledge transfer and collective learning based on proximity and trust. Furthermore, the importance of local collective goods on which tourism depends, such as clean beaches, harmonious construction and suitable planning demands for joint and collective action. This confirms the relevance of territories and local characteristics as determinants of tourism innovation.

3.3.2 A general overview of innovation in services

Considering that tourism is made of services, it is useful to provide an overall approach to innovation in service firms. Do they innovate? Do they innovate similarly to manufacturing firms? What characteristics or differences can be found in services' innovative patterns?

Despite the growing attention devoted to research on innovation in services, it is widely acknowledged that most insights on this matter derive mainly from studies of innovation in manufacturing, as innovation research is traditionally more directed to manufacturing than to

services (Drejer, 2004; Miles, 2006; Sirilli & Evangelista, 1998). Innovation in services started to receive greater attention from 1980's onwards, although only in the 1990's significant research projects on the matter were launched and in the end of 20th century services innovation started to be considered in R&D and innovation surveys (Miles, 2006). The growth of services and of their importance in global economy and the need for innovation in services as well, in order to assure the overall competitiveness of economies, demand for more advanced understandings on the matter.

Research on service sector and on innovation in services can be divided into three different approaches: *assimilation*, *demarcation* and *synthesis* (Coombs & Miles, 2000). Within the *assimilation approach*, services are considered to be similar to manufacture in terms of dynamics and general characteristics, which allows services to be studied under the same theories and tools developed for manufacturing, provided the necessary adaptations are made. In result of their empirical work on service innovation, Gradrey et al. (1993, cit in Sundbo, 1997) defend that innovation theories developed within manufacturing innovation studies may be applied to services, being however necessary to enlarge the concept in order to include a new service idea or concept as innovation. Traditional assimilation approach often considers services as unprogressive, with a reduced capacity to change or to adapt to changes, and tend to be supplier-dominated, as they are extremely dependent on external technological inputs in order to innovate. They moreover demonstrate little creativity in applying theses technologies to business operations (den Hertog, 2000, p. 499; Tether, 2004).

Conversely, *demarcation approach* considers that services and their innovation activities are very different from manufacturing, with dissimilar dynamics and features that require different theories and tools from those developed for and applied to manufacturing. Within this discussion, several authors had, in the last decades, defined what they consider to be the distinctive characteristics of services when compared to manufactured goods. Zeithaml et al. (1985), Miles (2006), Gallouj and Weinstein (1997), among others, present the following main characteristics:

- *Intangibility*, because services cannot be seen, felt, tasted or heard. They are performances, exhibitions. Conversely, goods are tangible and therefore are unable to be sensed. Despite this, different services can have different degrees of tangibility/intangibility, which will have implications on the way they are evaluated and

understood by the customers, as well as on the ways in which firms innovate. The main implications for innovation are that services are unable to be stored, cannot be immediately displayed or communicated, cannot be protected through patents and are therefore easily imitable. Sundbo (1997) alerts to the fact that, if innovations are easily imitable, then firms must assure that are constantly engaged in innovative activities in order to be competitive. Consequently, innovations will be more incremental than radical.

- *Co-terminality,* or the inseparability of production and consumption is related to the fact that, in services, production and consumption occurs simultaneously and with a high supplier-client interaction. While manufactured products are first produced, then distributed, sold and consumed, in distinctive time and place, in services it all occurs at the same time. Consequently, customers are present and involved in the production process, affecting and shaping them. The close interaction to customers may prompt the establishment and utilisation of external networks and foster the involvement of customers in the innovation process, transforming them into agents of innovation (Gadrey, Gallouj, Lhuillert, & Weinstein, 1994).

- *Heterogeneity.* Being 'produced' by human beings, in the presence of their customers, services are always different, as each performance is unique, subject to the variability of human behaviour. If this is true regarding a single service provider, it gains a higher significance if all firms providing similar services are considered (restaurants, hotels, etc.). In result, standardisation and quality control are more difficult to achieve because each service transaction creates a specific set of characteristics. Furthermore, a question arises: if innovation occurs with a new product, then each service transaction being performed differently could ultimately be considered as an innovation (Gallouj & Weinstein, 1997)?

- *Perishability* means that, due to intangibility, services cannot be saved. If a certain service is not sold, it cannot be stored to be purchased later. Hotel rooms or flight seats that are not purchased are considered to be lost. This brings serious implications to the management of supply and demand, especially in tourism where seasonality has a significant impact in revenue discrepancy between high and low season. This opens up opportunities or, even more, demands for innovative solutions developed by tourism destinations.

Besides the above mentioned, Sirilli and Evangelista (1998) present other features of services that distinguish them from goods and are highly recalled in the literature:

- Services' products and processes are information intensive. Thus, ICT has a wide scope of application and plays a central role in services innovation;
- Human resources are also very important due to the close relationship with customers occuring during service performance. Service firms should regard human capital as a privileged area for innovation to develop;
- Organisational factors play a critical role in services, due to the fact that process innovations are in large scale much more significant in services than product innovations. Process innovation often involves changing in organisational structures within the firm or at inter-firm level.

It was already referred that quality standards and quality control, although more difficult in services, should be an important focus of innovation in services, due to the high importance of the overall experience. Quality control can serve as a trigger to innovate by understanding the different components of services (modularisation) and by generating insights into the ways in which these components can be recombined into new services (Miles, 2006; Sundbo, 1998a). This can also be referred to as *recombinative innovation*, which brings implications to the standardisation of services, as their characteristics must be specified (Gallouj & Weinstein, 1997; Levitt, 1965).

It can also be added to this review that, in services, it is hard to distinguish between product and process, which results from the co-terminality of services, as argued by Gallouj and Weinstein (1997). Consequently, product and process are closely intertwined and mixed indistinctively in the service experience. It is important that these two concepts can be distinguished, for it has implications for quality control and overall service innovation practices. Within this context, Gopalakrishnan et al. (1999, p. 156) provide a distinction between the two: "*An innovation was identified as a product innovation when it was a new product or service that was introduced to meet an external user or market need. An innovation was identified as a process innovation when it was a new element introduced to an organization's production or service operations (input materials, task specifications, work and information flow mechanisms, and equipment) to produce a product or render a service*".

Despite being more complex, as it involves difference dimensions of the organisation, services innovation takes less time to develop, which results from the fact that it is based on ideas, rather than R&D, making them more easy to develop. However, previous testing is more difficult. Human capital is also more emphasised in services innovation than in goods, as the later relies more on equipment. Finally, innovations in services are more incremental than radical (Droege, Hildebrand, & Forcada, 2009; Hipp & Grupp, 2005; Tether, 2005).

Within demarcation approach, services are considered to be dynamic and fluid, gifted with the ability to constantly change in order to serve customers needs and wants. It is possible for services to achieve innovative combinations of "hard" (tangible equipment) and "soft" (human capital, skills, practices) elements, being the later more important for services innovation (Coombs & Miles, 2000), as mentioned above. Thus, service organisations can innovate endogenously by creatively combining their internal assets based on human capital with the ability to understand and interpret customers' desires. Therefore, rather than being seen as passive and supplier-dominated, services do innovate differently from manufacturers by focusing on the softer aspects of innovation based on workers skills and on cooperation networks (Tether, 2005).

Finally, a more recent approach (*synthesis approach*) depicts that service providers and manufacturers do not follow entirely different approaches to innovation. According to this perspective, innovation is not restricted to the established dichotomy between manufacturing and services (Coombs & Miles, 2000). Through the findings of service innovation studies, it tries to bring to the forefront elements of innovation which have been neglected and are relevant for services as well as manufacturing, as they are distributed across the economy (Drejer, 2004). For instance, de Jong and Marsili's study of innovative firms concluded that many patterns are found indistinctively in both areas, "*as the boundaries between manufacturing and services have blurred as services and manufacturing activities are often closely bundled within organizations*" (de Jong & Marsili, 2006, p.226). The main goal of this approach is to develop theoretical and empirical approaches flexible enough to embrace all economic activities, regardless of being services or goods (Gallouj & Weinstein, 1997; Tether, 2004).

3.3.3 How do service firms innovate?

In their empirical research Gadrey et al. (1994) concluded that innovation occurred in every service firms engaged in the study. However, R&D was considered to be less important, as only a few firms had innovation departments, especially those related to electronic information services, where R&D departments existed and were highly connected to science.

Sundbo (1997) concluded mostly the same. In his study, service firms do not consider R&D as an important source of innovation, as they mainly innovate on the basis of rapid ideas, rather than on scientific results. His work also demonstrated that information technologies are very important for service firms' innovation, and may be developed endogenously or by technology providers. In this context, it was also concluded that process innovations were mainly technological, such as new travel or hotel booking systems. This study has a particular interest, related to the author´s analysis of the engagement of service firms in networks in order to develop innovations. His conclusions demonstrate that in large firms run by strategic management, network relationships are weak and of reduced importance for innovation, mainly due to problems of imitation. Notwithstanding, informal contacts with colleagues of other firms seem to be the most important vehicle for new ideas and knowledge exchange. Conversely, a group of small firms stood out as 'networked organisations' as they had the purpose of fostering innovation through network participation, involvement of customers, support of entrepreneurship and exchange of knowledge. It is worth noting that these were all tourism firms.

An interesting situation that occurs often in services innovation is that product level innovation usually demands for subsequent changes at the process level (Gallouj, 1998), a situation that is not so obvious in manufacturing. In den Hertog's perspective, this also results from the close interaction with customers because, in order to innovate in services, rather than changing some minor features in final service, it is necessary to introduce many changes in several parts of the service and its organisation (den Hertog, 2000). Process innovation in services includes more systemic and complex knowledge than product innovation and is considered to be more effective. In what regards tacit knowledge, no significant differences are registered (Gopalakrishnan et al., 1999).

Within innovation systems, Miles (2006) considers that R&D organisations do not fulfil the requirements of service firms. Therefore, few of them demonstrate strong linkages, either to universities/ research centres, or to national or regional innovation systems. In consequence, many firms are unable to innovate based on relevant knowledge and collective learning. This derives from the fact that, rather than relying on R&D, innovations in services are often conducted on an *ad-hoc* basis. Gallouj and Weinstein (1997, p. 549) provide a good definition of this concept: "*Ad hoc innovation can be defined in general terms as the interactive (social) construction of a solution to a particular problem posed by a given client*". It occurs especially in services involving high levels of interaction between customer and service provider. The authors further refer that *ad hoc* innovations produce new knowledge and competences. Although, as they are tacit, they should be codified so that they can be transmitted to others and become a practice that is repeated in different circumstances. It is, this way, linked to cumulative learning processes.

But how do Portuguese service firm behave regarding their innovation patterns? Portuguese data from the Community Innovation Survey (CIS) 2010 (Gabinete de Planeamento, Estratégia, Avaliação e Relações Internacionais [GPEARI], 2012) can bring some fruitful evidence on this matter[4].

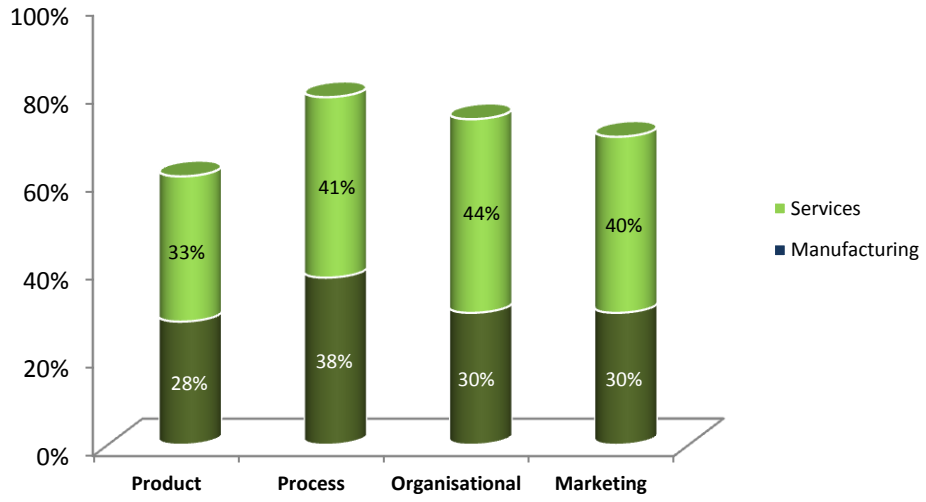
The results of CIS 2010 show evidence that 60,8% of Portuguese firms were engaged in innovation activities between 2008 and 2010. However, the relevance of innovation in service sector is higher than in manufacturing, that is, 67% of the surveyed service firms presented innovation activities (an increase towards the percentage registered in 2008 – 64%), compared to 56,4% in manufacturing (54% in 2008). If this difference is visible at overall level, it is even more accrue when different types of innovation are considered (Figure 3.17).

Service firms seem to undertake more innovations at organisational (44%) and process level (41%); product and marketing innovations, although with significant rates, are less expressive. When compared to manufacturing firms, services seem to be more innovative in all the considered types. Despite this, 38% of the manufacturers developed process innovations, being

[4] The Community Innovation Survey only inquires firms with more than 10 employees. Considering this, the analysis made in this section is useful to provide a general picture of innovation in services, but it cannot be generalised to the population of tourism firms, because a significant part of them has less than 10 employees. Moreover, the 2010 Portuguese CIS did not inquire any firm of the tourism industry.

this the highest observable rate within this group, followed by product, organisational and marketing (with 28%, 30% and 30% respectively). This allows to conclude that technological innovations (product and process) seem to be more important for manufacturing firms than non-technological innovation (organisational and marketing). In what concerns product innovation (goods or services), 15% of Portuguese service firms claim to have introduced products that were new to the market and 24%, new only to the firm, against 13% and 20% of manufacturers, respectively.

Figure 3.17 – Rate of types of innovations developed by Portuguese service and manufacturing firms, 2008-2010 (%)

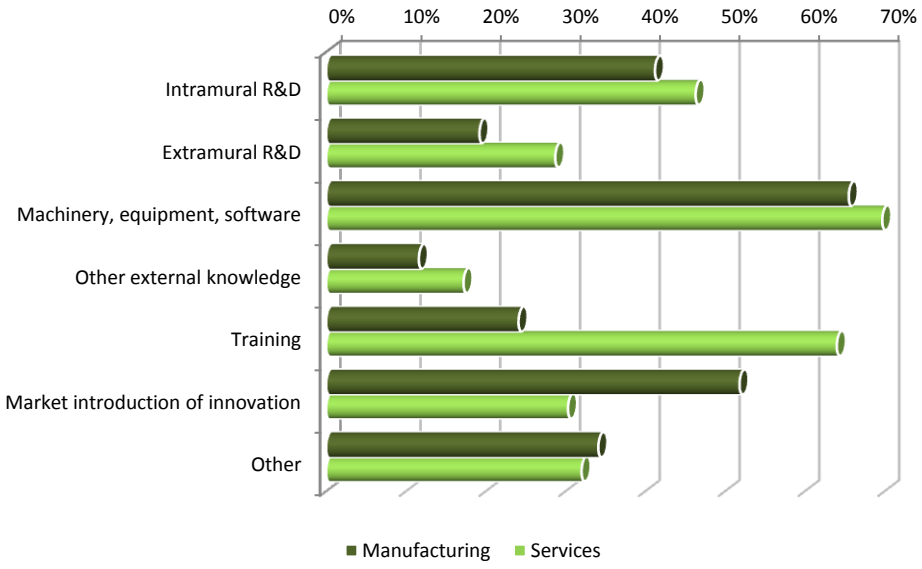


Source: Own elaboration based on GPEARI (2012)

As shown in figure 3.18, there is not a marked difference between services and manufacturing firms, in what concerns their overall engagement in innovation activities. Despite this, it is worth noting that service firms engage more significantly in training their human resources. Human capital is of foremost importance for innovation in general, and in services in particular. Innovation in services occurs often during interaction between service provider and customer (co-terminality), and also results frequently from quick ideas developed by qualified workers. A qualified and skilled workforce will positively impact on firms' innovative performance. Conversely to what several academics concluded on their studies, Portuguese service firms seem to rely on R&D for their innovative activities, even more than manufacturing. Service firms conducting

intramural R&D accounts for 46% and extramural R&D for 29%, while in manufacturing firms, these values account for 41% and 19%, respectively. It seems, therefore, that service firms call upon external R&D more often. The graphic also demonstrates that the proportion of service providers engaged in intramural R&D is also higher than manufacturers. Moreover, the engagement in internal R&D by services is 20% higher than external R&D, meaning that service firms may be counteracting the bias that they do not have R&D departments or qualified human resources working in research and development.

Figure 3.18 – Engagement in innovation activities by Portuguese service and manufacturing firms, 2008-2010 (%)

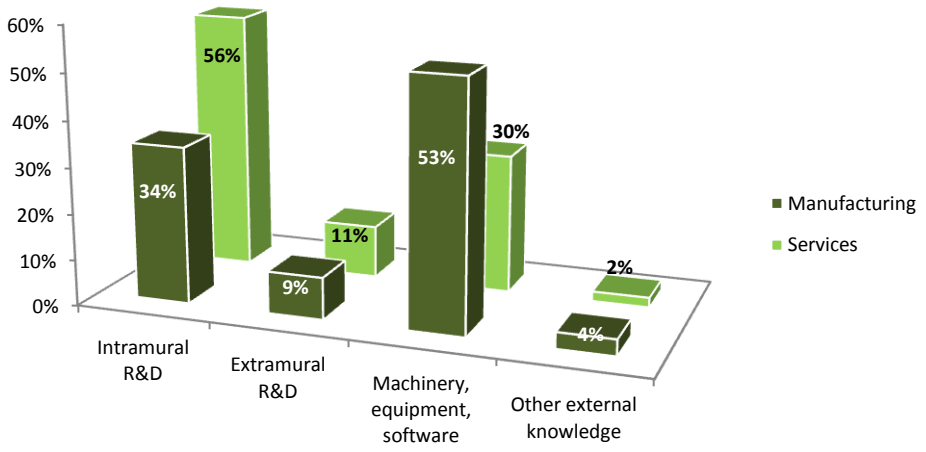


Source: Own elaboration based on GPEARI (2012)

In what relates to the expenditures in innovation activities, an interesting situation occurs: there are more service firms investing in intramural R&D that manufacturing firms (56% of services against 34% of manufacturers), which goes against the findings of Gadrey et al. (1994) and Sundbo (1997). Although with a less expressive difference, extramural R&D also presents a disparity (9% of manufacturing firms against 11% of services). The opposite is registered for the acquisition of other external knowledge (2% against 4%). The only activity in which manufacturing surpasses services is in the acquisition of machinery, equipment and software, with 53% against 30%.

At overall level, innovation expenditures by Portuguese firms reach 2.453,7 million Euros (a decrease of 13% in face of the 2.822 registered in 2008). 47,2% (1.157,8 million Euros) are invested by manufacturing firms while the remaining 52,8% (1.295,9 million Euros) are spent by service firms. The Community Innovation Survey presents another interesting indicator: the innovation intensity, which traduces, in percentage, innovation expenditures as part of firms' turnover. According to this, manufacturing firms present a ratio of 1,9%, while service firms represent 1,2%. If these results analysed in light of the previous graphic, one may conclude that the acquisition of machinery, equipment and software might represent a higher level of investment, when compared to other types of innovation activities, namely the ones in which services are more engaged to.

Figure 3.19 – Expenditure in innovation activities by Portuguese service and manufacturing firms, 2008-2010 (%)



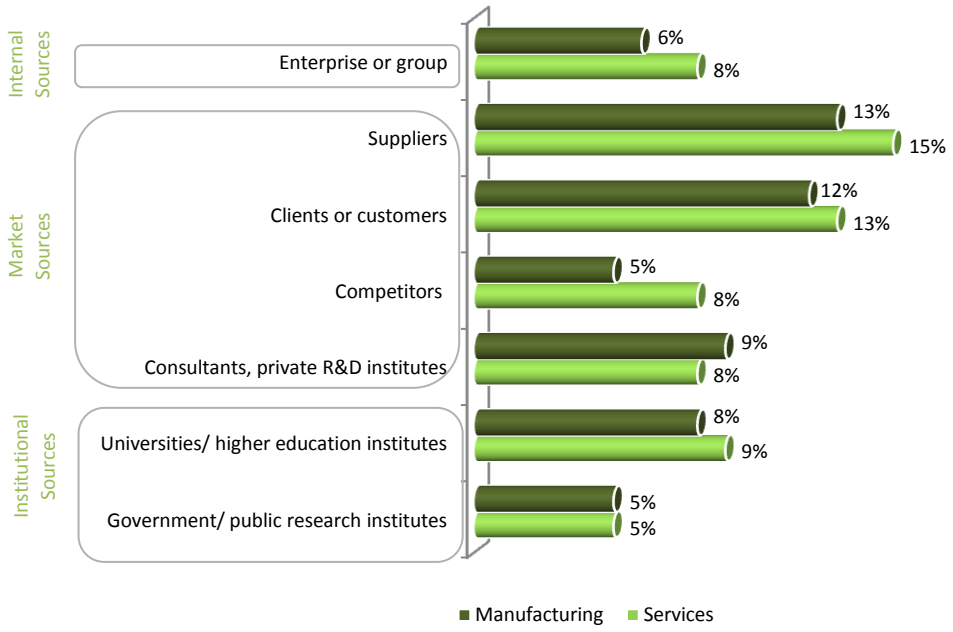
Source: Own elaboration based on GPEARI (2012)

It is also worth analysing the partnerships established by service and manufacturing firms in order to develop and implement innovations (Figure 3.20). There are not extreme differences between them. Small differences can be observed in cooperation with other firms in the same group, although service firms rely more on internal sources than manufacturing enterprises (8% against 6%, respectively), as well as on suppliers (15% vs. 13%) and on universities (9% vs. 8%). This

reinforces the thesis of the importance of human resources in services innovation. Customers are also well positioned as a source of innovation for both groups of firms, while the scientific knowledge from universities achieves higher importance for service providers.

The government and public research institutes register lower values, alongside with competitors for manufacturing firms. Overall, it can be concluded that service firms are more predisposed to engage in cooperation in order to innovate than manufacturers. They present higher cooperation rates with almost every type of partners, registering 21% for any type of cooperation, against the 19% of manufacturing sector (GPEARI, 2012).

Figure 3.20 – Sources of information and cooperation established for Portuguese service and manufacturing firms, according to the type of partner 2008-2010 (%)

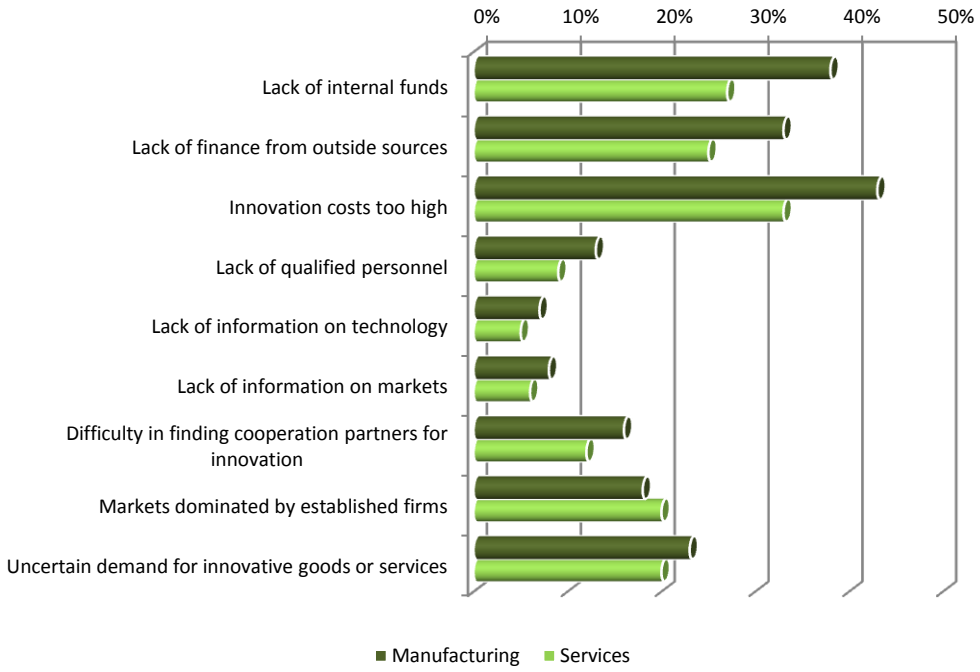


Source: Own elaboration based on GPEARI (2012)

Finally, in what concerns the factors that constrain innovation in Portuguese firms (Figure 3.21) it is observable that funding and financial issues those presenting higher response rates in both service and manufacturing firms, but especially by the later. The costs associated with the development of innovation are especially relevant for 43% of manufacturers, as they rely mainly on the investment in equipment, machinery and research and development. Additionally, the lack of internal and external funds worsens this situation. It is also relevant to highlight the market

issues, namely the dominance by already established firms, which is the only factor where service firms surpass manufacturers (20% vs. 18%) and the uncertainty that innovations will be accepted by customers, transforming innovation processes into risky endeavours usually with high costs: the cost of investment, of eventual imitation and of dealing with a new good or service that is not accepted by customers. It is interesting to note that finding cooperation partners for the development of innovation does not appear to have a significant negative impact, as only 16% of manufacturing and 12% of service firms refer it as an obstacle.

Figure 3.21 – Main factors hampering innovation in Portuguese firms 2008-2010 (%)



Source: Own elaboration based on GPEARI (2012)

3.4 The dynamics of territorial innovation: why firms agglomerate?

An economic agglomeration refers to the "*spatial accumulation of economic activities of the same kind, more specifically the accumulation of companies belonging to the same branch or industry and immediate branches or industries*" (Kolehmainen, 2003, p. 4).

Gordon and McCann (2000) identify three distinct basic models of territorial agglomerations: (i) the model of pure agglomeration; (ii) the industrial-complex model; and (iii) the social-network model. The model of pure agglomeration assumes an absence of formal structures and of long-term relationships among businesses. There is no form of cooperation between actors, as firms rely on fragmented and unstable relations among them, in response to market opportunities. The economic environment is therefore "atomised" and competitive. Within this model, agglomeration economies exist only due to geographical proximity and accrue to all local firms. The cluster is characterised by having "open membership". Conversely, the industrial-complex model is based on long-term stable and identifiable relationships among the firms in the cluster manifested in their spatial behaviour. This type of spatial agglomeration occurs because proximity allows the reduction of transport and transaction costs and firms determine that this is best achieved if companies from the same value chain are located close to each other. The firms of the cluster take on important long-term investments in order to be part of the agglomeration (such as physical capital and real estate); therefore, the access to the cluster is very restricted. The social-network model is strongly linked to Granovetter's work on the social embeddedness of economic relationships (Granovetter, 1973, 1985) and emphasises the role of relationships of mutual trust and lack of opportunism among organisations that emerge from common history and shared experience. Social networks in economic clusters are an alternative to pure agglomeration and industrial complex models, which are associated to different regulation forms: the former is closely related to markets and the later to hierarchies. This model is considered to be a-spatial; however, geographically speaking, territorial proximity among agents will foster the emergence of relationships of trust, confidence and cooperation (Gordon & McCann, 2000; Kolehmainen, 2003; McCann, 2008).

In what concerns to innovation, pure agglomerations are very flexible, but also very fragmented, which may constrain knowledge spillovers and collective learning and consequently, innovation. On its turn, industrial complexes may cause situations of lock-in. Its hierarchical nature and asymmetric dependency relationships can inhibit the development and diffusion of innovations (Kolehmainen, 2003). Social networks, due to its nature of high levels of coordination, trust, shared culture and experience among organisations, seem to be privileged forms of organisation for collective learning and knowledge exchange, fundamental inputs to innovation, especially when geographic proximity is elevate.

Agglomerations of firms result thus from centripetal forces (the so-called agglomeration externalities or economies) that shape the spatial configuration of economic activities; that is, firms tend to locate geographically close in order to benefit from the advantages of that proximity. Due to these externalities, economic agglomerations are the fortunate spaces for technological and social innovation to develop (Fujita & Thisse, 1996). Agglomeration externalities can be broadly defined as the benefits that firms obtain from being located in close proximity to other economic agents and can be divided in two types: one is linked to general economies of concentration that apply to all firms and industries in a location (diversified industries); the other results from the specific economy related to firms engaged in similar or connected activities, which leads to the development of industrial districts (specialisation) (Malmberg, Solvell, & Zander, 1996).

Alfred Marshall (1890) was one of the first authors analysing the reasons for and the effects of spatial agglomerations on economic growth and innovation. Following Smith's perspective on labour specialisation, his studies on industrial districts lead him to conclude that firms locate close to each other due to three main reasons (known as Marshallian externalities):

- **i.** Availability of a specialised and skilled labour market pooling that grows and is sustained by a large local industry;
- **ii.** Increased local provision of supporting trades (or input-output linkages with suppliers and customers), which are attracted by the high local industrial concentration. This proximity to suppliers and customers promotes joint innovation;
- **iii.** Knowledge spillovers through processes of collective learning and transfer of skills and know-how that are assisted by face-to-face contacts, more frequent among actors that are located in close geographic proximity.

Marshall furthermore referred to the benefits deriving from the embeddedness of networks of specialised producers within localities containing a specific *industrial atmosphere.* Similar concepts as that of the industrial atmosphere have later been applied to explain the benefits of agglomerations and of their networks such as the *institutional embeddedness* (Camagni & Capello 2000), the *institutional endowment* (Maskell and Malmberg, 1999), *conventions* (Storper, 1997) or the *institutional thickness* (Amin & Thrift, 1994).

Externalities can be technological or non-pecuniary (such as spillovers) and pecuniary (mainly associated to productive activity). While the former refers to the effects of non-market interactions between agents, the later results from benefits of economic interactions that occur due to market mechanisms (Johansson, 2005; Scitovski, 1954). Marshall's externalities are a mixture of both these categories. Non-pecuniary externalities are associated with creative processes, in which personal communication, namely in the form of face-to-face contacts between individuals, sets as a vital input (Lucas, 1988, cit in Fujita & Thisse, 1996). An economic agglomeration results thus from both pecuniary and non-pecuniary externalities. The later seems to play an increasingly important role in economic growth and innovation, especially to those involved in the production and consumption of intangible goods, such as knowledge.

While some studies focus mainly on the analysis of innovation from a firm-based perspective, others confirm that knowledge that is external to the firm is extremely relevant, because the ability to innovate is prompted by knowledge transfer among firms and individuals and by collective learning. In this context, knowledge spillovers and more specifically, the geographical dimension of knowledge spillovers, knowledge creation and exchange and its contribution for innovation and regional growth are highlighted by several authors (Audretsch & Feldman, 1996b; Audretsch & Feldman, 2004; Bathelt, Malmberg, & Maskell, 2004; Capello, 1999; Cappellin, 2007; Gertler, 2003; Henry & Pinch, 2000; Jaffe, Trajtenberg, & Henderson, 1993; Malmberg & Maskell, 2002; Malmberg & Power, 2003; Malmberg et al., 1996; Morgan, 2001; Romer, 1986; Roux, Dang, Thomas, Longhi, & Talbot, 2009). The existence of information and knowledge spillovers among firms is a strong agglomeration force. Knowledge and information are public goods, meaning that the use of either both by a firm does not diminish its content and value for others. If the knowledge and information of firms is different, the benefits of communication increases as the number of networked firms grow. Furthermore, since the quality of information and transfer of (tacit) knowledge are associated to distance-decay effects, the externalities rise when firms are geographically close to each other (Fujita & Thisse, 1996).

In this context, four types of externalities can be distinguished: Marshall-Arrow-Romer (MAR), urbanisation, Porter's and Jacob's externalities (Table 3.7). MAR externalities have their roots on Marshall's work, especially in his theory concerning knowledge spillovers in industrial districts. This theory was later expanded by Arrow and Romer. Glaeser, Kallal, Scheinkman and Shleifer (1992) linked these approaches and referred to them as Marshall-Arrow-Romer (MAR)

externalities, highlighting the fact that the proximity of firms in the same industry favours knowledge transfer between them and, thus, the growth of that industry and of the region in which the agglomeration is located. Moreover, MAR theory supports that local monopoly is more suitable for growth and innovation than local competition by preventing that ideas are transferred to other and thereby allowing that externalities are internalised by the innovative firm or individuals. Conversely, Porter (1990) insists that is competition (associated to cooperation) and not monopoly that fosters growth and innovation. However, he agrees on the specialisation argument: knowledge spillovers will favour innovation in specialised and geographically concentrated industries.

Table 3.7 – Agglomeration externalities

	Production Costs	Knowledge and Skills	Other
Urbanisation	Land rents Wages Congestion	Highly skilled employees Knowledge infrastructure	Access to large market Access to sophisticated market
MAR	Matching costs labour Market Minimize inventories	Specialised labour force Intra-industry knowledge spillovers Joint innovation efforts within value chain	Access to specialised clients and suppliers
Jacobs'	Low risk environment Large variety of goods and services Lack of focus	Inter-industry knowledge spillovers	Reduced volatility in demand and supply

Source: adapted from Neffke et al. (2008)

While MAR theory and Porter argue for the local specialisation, this approach brings an important discussion. The restriction of knowledge externalities to the same industry neglects an important source of new knowledge: inter-industry knowledge spillovers. Accordingly, Jacobs' externalities insist that it is the variety and diversity of geographically close industries that promote innovation, because the most important knowledge transfer comes from other industries. Diversification allows combining different sources and types of knowledge, often resulting in innovative solutions for problems, inter-industry knowledge and new product combinations. In this context, the author considers that cities are privileged locations for innovation due to the highly diversified knowledge sources present in urban environments (Jacobs, 1969; Neffke, Henning, Boschma, Lundquist & Olander, 2008). In Jacobs' externalities, and similarly to Porter's approach, local competition is seen as benefactor for innovation, as it favours the rapid adoption of new

technology and encourages firms to search for constant innovations. Within this line of thought, urbanisation externalities refer to the advantages that firms can achieve for being located in large cities. These provide access to quality public and professional services, strong knowledge infrastructures (mainly because universities and research centres are located in urban areas) leading to the presence of high skilled employees that can expand their knowledge by moving between firms and better access to larger local and international markets (Neffke et al., 2008).

Johansson argues that externalities arise due to proximity and network effects, affecting transaction costs and facilitating information spillovers. The impacts of externalities may be observed at efficiency and/or innovation levels. Innovation externalities relate to a dynamic process that brings changes on economic efficiency and on product novelty and diversity. Concerning these impacts or consequences, the author goes further and distinguishes between vertical and horizontal externalities (Table 3.8).

Table 3.8 – Horizontal and vertical externalities classified against efficiency and innovation externalities

Efficiency Externalities	Innovation Externalities
Vertical ▪ Downstream externality that affects the price suppliers can charge a consumer ▪ Upstream externality that affects the input costs of a firm	**Vertical** ▪ Downstream externality that affects knowledge flows between a supplier or a customer ▪ Upstream externality that affects the knowledge flows between an input-buying and an input-selling firm
Horizontal ▪ Cooperation between two or several competitors, e.g. joint transport and marketing solutions of long-distance export	**Horizontal** ▪ Knowledge flows between competitors, e.g. joint R&D efforts based on a link or based on spillovers phenomena
Pure Demand ▪ The size of local demand facilitates the exploitation of scale economies for suppliers of distance sensitive products	**Pure Demand** ▪ Size and diversity of local demand facilitates experiments and communication with customers in the process of product development in the early phases of a product cycle

Source: Johansson (2005, p. 112)

The study of externalities, as referred, deals mainly with the issue of territorial proximity and the advantages that it can bring to firms in economic agglomerations. However, authors like Negroponte (1995) claim that, in result of the development of information and communication technologies and globalisation, "*geography is dead*". The thesis is drawn on two main transformations: *tradability*, because due to ICT, the production and consumption of services can

occur in distinct places and time; and *codification*, as it makes possible to accelerate the codification of knowledge (Morgan, 2001, 2004). However, while codified/explicit knowledge and information can be transferred at long distances at low costs, the same does not happen with tacit knowledge, characterised by being personal, firm-specific and dependent on the context in which it develops (Lam, 1998; Nelson & Winter, 1982; Polanyi, 1966). Due to its nature, it is only possible to transfer tacit knowledge through personal, face-to-face interactions in a context of shared experiences. Being knowledge and collective learning a major input for territorial innovation, the role of geography has been more widely integrated in recent theories of innovation (in contrast to neo-classical approach) (Morgan, 2001, 2004). Innovation is, thus, a geographical process which is facilitated by spatial agglomeration and clustering of regional agents (Amin & Thrift, 1994; Saxenian, 1994). However, it is now of general understanding that localisation and globalisation, instead of being perceived as mutually exclusive processes, are in fact more interwoven than is generally acknowledged (Morgan, 1997).

> *"The renewed interest in tacit knowledge is largely due to its perceived social and spatial significance when learning and innovation are at a premium: socially, because tacit capabilities like team skills and organizational routines constitute the core competence of firms; spatially, because tacit knowledge, being person-embodied and context dependent, is locationally `sticky'"* (Morgan, 2004, p. 7).

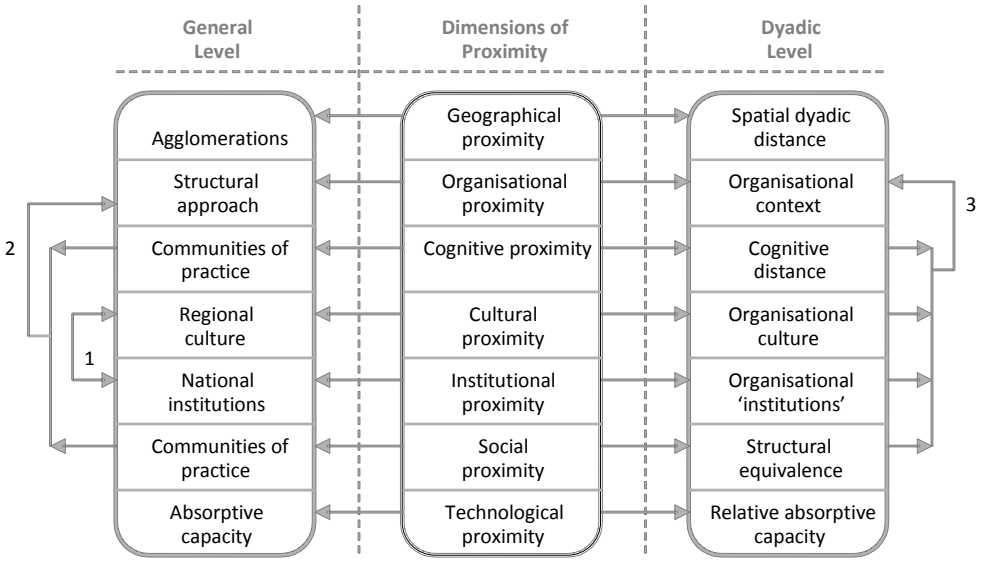
3.4.1 Proximity and innovation: a multi-dimensional analysis

The importance of geographical proximity for knowledge creation, learning and innovation is undeniable and fairly recognised by a large number of academics. However, as several authors acknowledge, geographical proximity between economic agents, although fostering interactive learning and innovation and creating the required potential for it, is not a sufficient or isolated condition for these processes to occur (Boschma, 2005; Gertler, 2003; Kirat & Lung, 1999; Lagendijk & Lorentzen, 2007; Lorentzen, 2007; Torre & Rallet, 2005; Tremblay, Fontan, Klein, & Rousseau, 2003).

Other types of proximities (such as organisational, cognitive, institutional) are necessary and have thus to be considered in a complementary perspective in order to territorial innovation to emerge (Feldman, 1999, 2003) or, as Boschma (2005) sustains, other dimensions of proximity should be

analysed, as they are strengthened by geographical proximity if and when they co-exist. Proximity should then be viewed as a multi-dimensional concept encompassing different forms of relationships that are not confined to territory. Proximity is in fact an ambiguous concept as it "*concentrates in a single term the multiplicity of spatial scales within which economic actors and individuals situate their actions*" (Torre & Rallet, 2005, p. 49).

Figure 3.22 –Dimensions of proximity at general and dyadic level



Source: Knoben and Oerlemans (2006:79)

The "*de-territorialisation of closeness"* concept clearly states this point of view. Firstly used by Bunnel and Coe (2001) and later by Gertler (2003), it emphasises the idea that learning and the exchange of tacit knowledge (and consequently, innovation) does not depend exclusively (or only) on geographic proximity, if other dimensions of proximity are verified. Social or organisational proximity, for instance, may result from face-to-face relationships; however, those can also be achieved at distance (Amin, 2000). The main point here is that the proximity among actors required for processes of collective learning and innovation to occur may derive from dimensions that do not result directly from territorial clusters. Despite this, geographic proximity and territorial agglomerations are highly associated with these dynamics, as they favour and create a higher potential for other types of proximity to develop.

The multiplicity of approaches brings some ambiguity to the proximity issue. In some cases, concepts are used with different applications, while in other situations the definitions of distinct

terms overlap. In order to clarify them, the several dimensions of proximity present in the literature will be discussed.

Table 3.9 – Types of possible proximities among organisations

Proximity	Authors	Brief Description
Physical/ Geographical/ Spatial	Tremblay et al. (2003); Boschma (2005); Torre and Gilly (2000); Kirat and Lung (1999); Bouba-Olga and Grossetti (2005); Knoben and Oerlemans (2006); Freel (2003)	Distance between economic actors, either in absolute or relative terms. It is fundamental for innovation, but should be combined with other type(s) of proximity. Small distances facilitate contacts, but are not sufficient for interaction and innovation.
Organisational	Tremblay et al. (2003); Boschma (2005); Torre and Gilly (2000); Kirat and Lung (1999); Freel (2003); Knoben and Oerlemans (2006)	When relations occur in an organisational arrangement, within the organisation or between organisations. Implies coordination towards common economic goals.
Institutional	Tremblay et al. (2003); Boschma (2005); Torre and Gilly (2000); Kirat and Lung (1999); Freel (2003)	Common norms, values and codes of conduct, language, cultural habits, legal constraints, etc. that influence the economic behaviour of individuals and organisations, which are expected to be similar.
Technological	Tremblay et al. (2003); Kirat and Lung (1999); Knoben and Oerlemans (2006)	Results from the knowledge of economic agents regarding a specific technology or a collective know-how shared by an organisation's members.
Cognitive	Boschma (2005); Freel (2003); Bouba-Olga and Grossetti (2005)	Although similar to technological proximity, it appears to be broader and refer to the efficiency of communication between actors (how they communicate).
Social/ Relational	Boschma (2005); Bouba-Olga and Grossetti (2005)	Relations between economic actors that are socially embedded, that is, result from personal interaction (friendship, family, etc) and are based on trust.

Source: own elaboration based on cited authors

Geographical proximity is defined as the "*spatial or physical distance between economic actors, both in its absolute or relative meaning"* (Boschma, 2005, p. 69), being the absolute distance measured by the physical distance that separates actors (e.g. kilometres) and the relative through the travel time or perception of distance by the actors (Knoben & Oerlemans, 2006). Geographical proximity is important to innovation because small distances facilitate planned and/or random face-to-face contacts, brings organisations together and fosters knowledge transfer (especially tacit knowledge), collective learning and innovation. Some studies, such as the one developed by Jaffe et al. (1993) on knowledge spillovers and Audretsch and Feldman (1996b) on the location of innovative activities confirm that knowledge externalities are related to geographical bounds, as

firms located close to knowledge sources tend to be more innovative than others. This way, knowledge is expected to be exchanged between individuals who are more closely located.

In Torre and Gilly's perspective, geographical proximity is strongly related to the concept of *geonomic* space, regarding the localisation of firms and encompassing the social dimension associated with economic mechanisms. This notion may be found on the basis of the industrial district model, analysed further in this chapter. Moreover, the authors state that economic agents are considered to be close geographically when they engage in daily face-to-face relationships (Torre & Gilly, 2000).

According to Boschma (2005), too much geographical proximity may hamper learning and innovation if situations of spatial lock-in develop. When regions become too much inward looking and reveal no openness to the outside world, their learning ability may be weakened and local actors may lose their innovative capacity. This problem can be solved by geographical openness and through the diversification of the local economic knowledge base (Jacobs externalities). However, this openness alone is not a sufficient condition, as the transfer of tacit knowledge will always require other types of proximity, such as cognitive and/or organisational.

The **cognitive proximity** concept was developed by Noteboom (1999) when discussing different forms of inter-firm linkages and their implications on competition and innovation. It is based on the idea that people that share the same or a similar knowledge base are likely to learn from each other (Boschma, 2005)[5]. Cognitive proximity enables people and organisations to understand each other and facilitates communication due to the closeness in language, theories, methodologies, general knowledge, etc. which will result in a similar way to understand and interpret the world. Firms usually search for new economic knowledge in close proximity to their knowledge base which implies that knowledge creation and innovation are by nature cumulative, localised and tacit.

This brings to the discussion the notion of "absorptive capacity" introduced by Cohen and Levinthal, defined as the "*ability of a firm to recognise the value of new, external information, assimilate it and apply it to commercial ends* [which is] *critical to its innovative capabilities*"

[5] Torre and Gilly (2000) and Torre and Rallet (2005) approach the cognitive dimension of proximity under organisational proximity, more specifically when referring to the *similarity logic* on which it is based on.

(Cohen & Levinthal, 1990, p. 128). Cognitive proximity among agents is essential for the capacity to absorb new knowledge, to learn and, consequently, to innovate. For instance, when analysing the differences between Silicon Valley and Route 128, Saxenian (1994) points out that the accumulation of technical knowledge in Silicon Valley reinforced a shared technical culture and a specific language evolved, in which many of the technical terms used by local engineers would not even be understood by their counterparts in Route 128.

Despite the mentioned advantages, too much cognitive proximity may be harmful to learning and innovation, as it may constrain the absorption of different bodies of knowledge triggering new ideas (and innovation), lead to a cognitive lock-in by blocking the openness to new sources of knowledge and cause undesirable knowledge spillovers to competitors (Boschma, 2005). On the other hand, if cognitive distance is high, individuals will not be able to understand each other and the spillover of knowledge and information will be difficult or will occur at higher costs.

Organisational proximity implies the coordination among agents in order to achieve common goals (Tremblay et al., 2003). It may appear inside or between organisations, in this case, when they are linked by economic or financial relationships of dependency or interdependency (Kirat & Lung, 1999). Organisational proximity is not correlated to spatial closeness, although it is favoured by it. Boschma (2005, p. 65) defines it as "*the extent to which relations are shared in an organisational arrangement, either within or between organisations*". Within this context, the French School of Proximity highlights the relational nature of organisational proximity which encompasses the *adherence logic*, or the *logic of belonging* (meaning that the actors that are organisationally close belong to the same space of relations within firms or networks) and a *logic of similarity* between individuals that are 'alike', sharing the same reference space and knowledge (as mentioned, this concept is interpreted by Boschma as cognitive proximity) (Torre & Gilly, 2000, p. 174; Torre & Rallet, 2005, p. 49-50). While the first logic relates to an effective coordination between the involved actors, the later depends on the closeness of representations and functioning modes.

At this point, one my find useful to distinguish between organisations and institutions as these two concepts are often used interchangeably in everyday language. Institutions and organisations play a significant different role in the process of innovation. Edquist and Johnson (1997) consider

that organisations are institutions as concrete things and bring to mind the distinction between institutions and organisations postulated by North that goes as follows:

> *Conceptually, what must be clearly differentiated are the rules from the players. The purpose of the rules is to define the way the game is played. But the objective of the team within that set of rules is to win the game – by a combination of skills, strategy and co-ordination (…). Organisations are created with purposive intent in consequence of the opportunity set resulting from the existing set of constraints (institutional ones as well as the traditional ones of economic theory) and in the course of attempts to accomplish their objectives are a major agent of institutional change* (North, 1990, p.5 cit in Edquist & Johnson, 1997, p. 47).

Accordingly, organisations are formed by the institutional framework and simultaneously promote their change. Organisations may be of political, economic and educational nature; they are formal structures that have a specific purpose and are consciously created. Institutions emerge spontaneously are not characterised by a specific purpose (Edquist & Johnson, 1997).

Organisational proximity will depend on the level of autonomy and on the degree of control present in a network. It benefits learning and innovation because the transfer of knowledge requires strong ties between organisations. However, too much organisational proximity may lead firms to: (i) lock-in in specific exchange relations due to existent strong ties that inhibit the access to different sources of new knowledge and information; (ii) if there is a hierarchical and bureaucratic governance, feedback mechanisms will be reduced or inexistent, which will constrain the appearance and reward of new ideas as well as interactive learning; and (iii) lack of flexibility resultant from a hierarchical structure. If the relationships are tight and dependent, this may lead to a diminishing effort in undertaking innovative initiatives. On the other hand, too little organisational proximity increases the danger of opportunistic relationships in result of lack of control (Boschma, 2005).

Social proximity relates to "*socially embedded relations between agents at the micro-level*" and is based on trust, friendship and experience (Boschma, 2005, p. 66), which facilitates knowledge sharing and learning. Consequently, the existence of social relationships among economic actors is required for innovation to occur. Social proximity is even more relevant when it comes to deal with the exchange of tacit knowledge, as the presence of durable relationships based on trust and friendship will make that process easier. As these economic relations are engendered in trust and

loyalty, opportunistic behaviours are strongly reduced by social proximity, although not totally inexistent. Social proximity plays an important role when there is lack of institutional thickness or proximity, as economic agents tend to rely on more informal relationships.

It is useful, in this context, to recall the concept of *embeddedness* unveiled by Granovetter in 1985. The author argues that in modern industrial society, economic action is embedded in structures of social relations: "*behaviour and institutions (…) are so constrained by ongoing social relations that to construe them as independent is a grievous misunderstanding*" (Granovetter, 1985, p. 482). Thus, social proximity focuses on how social interactions between agents influence their economic behaviour.

Too much social proximity may, however, bring harmful effects to learning and innovation. Embedded relationships are characterised, as referred, by a significant amount of trustiness and loyalty, which may conduct to an underestimation of opportunism. On the other hand, these durable and committed relationships can lead to lock-in, that is, innovation and learning will be constrained by an established way of doing things or by the network's acceptance of new ideas or entrepreneurs (Boschma, 2005). Social proximity, or social networks, refers to the relationships between individuals and/or organisations. Therefore, it is applied to a micro-level of analysis and may not be easily identified in a defined geographical space.

Conversely, **institutional proximity** is mainly associated with macro-level framework, translated by general norms and values of conduct (Boschma, 2005) and shared language, cultural habits, legal constraints, incentives, and may be formal or informal in nature. However it can also be assessed at micro-level when these are embodied in specific exchange relations; in this case, one is referring to organisational and social proximity. Institutional proximity does not include the embeddedness notion neither social relationships, as it adds more of a macro and collective analysis to the proximity issue. In result of its characteristics, institutional proximity is largely associated with geographical closeness.

Institutional proximity strongly relates to the concept of "institutional thickness", brought in by Amin and Thrift (1994). According to the authors, four factors contribute to the construction of

local institutional thickness: (i) a strong institutional presence[6], enabling the growth of local practices and collective representations; (ii) high interaction among these institutions, which contributes to the development of a regional "social atmosphere"; (iii) development of structures of domination and/or patterns of alliance resulting in the collective representation of individual interests; and (iv) the development of a mutual awareness that all actors are engaged in common goals. If these conditions are assured, institutional thickness will emerge and may be defined as "*the combination of inter-institutional interaction and synergy, collective representation by many bodies, a common industrial purpose, and shared norms and values*" (Amin & Thrift, p. 15). These social and cultural factors strongly influence regional economic performance.

Institutions should then be understood as a 'glue' that keeps societies together, set on common habits, routines and practices, norms and laws that regulate the relations between people and groups of people within, between and outside organisations. Bearing this in mind and considering that innovation results from interactive learning processes, institutions will obviously affect them (Edquist & Johnson, 1997). Consequently, institutional proximity and institutional thickness will affect them as well.

Institutional proximity contributes to interactive learning and innovation because common habits, rules, customs and tradition facilitate knowledge exchange among agents. However, too much institutional proximity may constrain innovation. An institutional environment consists of a set of interdependent institutions. Significant changes in the system can disturb and modify the existent positions or roles played by them, which will bring instability. In result, either no change will take place, or only some minor changes that do not distress the established functioning of the system, which will cause local inertia and lock-in by the lack of opportunities taken and constraints to new ideas and innovations that may require new institutional structures or the redefining of old ones. On the other hand, reduced institutional thickness and proximity will weaken formal institutions and social cohesion and will diminish the importance of common values, which is also detrimental to innovation (Boschma, 2005).

Technological proximity may be defined as the *"interdependencies woven between the various activities within the scope of 'production relationships'"* (Kirat & Lung, 1999, p. 29). It results from

[6] "*Firms; financial institutions; local chambers of commerce; training agencies; trade associations; local authorities; development agencies; innovation centres; clerical bodies; unions; government agencies providing premises, land and infrastructure; business service organisations; marketing boards*" (Amin & Thrift, 1994, p. 14).

the knowledge that economic agents have about process and product technology, a specific and collective technological know-how that is shared by the members of an organisation or by organisations within a network (Tremblay et al., 2003). This technological proximity contributes positively to innovation because the similarity of knowledge bases allows firms to recognise the opportunities deriving from other actors in the network. However, these knowledge bases need to be different enough to prompt new knowledge and promote innovation (Knoben & Oerlemans, 2006).

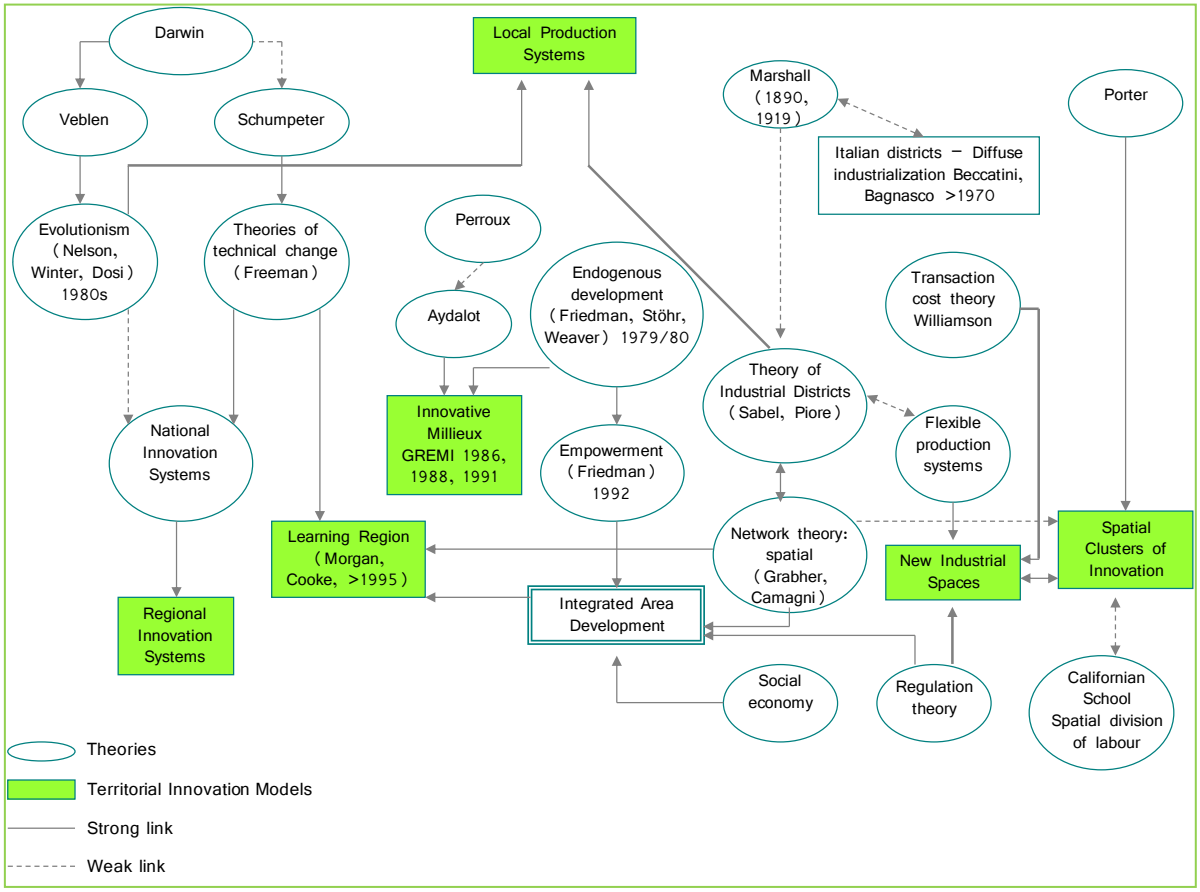
The concept of technological proximity seems quite analogous to cognitive proximity notion. However, Knoben and Oerlemans (2006) argue that the cognitive dimension is much broader, referring essentially to the efficiency of the communication between actors ("how" actors interact), while technological proximity regards the extent to which actors can learn from each other ("what" actors exchange). However, cognitive proximity also deals with technical and market competencies that organisations have and acquire, knowledge bases that are alike, transfer of codified and tacit knowledge among actors and the potential for learning and innovation between organisations with cognitive similarities, which leads to conclude that it may not be useful to distinguish between technological and cognitive proximity, as the later concept clearly includes the former.

Within this discussion, another term that is sometimes used in the literature and presents some ambiguity is the one of cultural proximity. It is applied in two different situations: cultural diversity between countries or regions; and differences in organisational culture (Knoben & Oerlemans, 2006). While the first approach seems to be very close to the one of institutional proximity, as it refers to similarities at the macro-level (translated in thoughts, behaviours and general understanding of the world), the later concept clearly overlaps with the one of organisational proximity. Therefore, for the purpose of this analysis, cultural proximity should not be considered on an isolated basis.

3.5 Territorial innovation models

The evolution of innovation models and taxonomies was formerly reviewed in this chapter. These models can be said to be are almost exclusively centred in how innovation process develops within firms, especially in early generations. However, their evolution departed from linear models towards interactive innovation processes, with a growing inclusion of elements external to the firm as fundamental pieces of innovation. This wider scope embraces not only other organisations, but also considers innovation as an interactive phenomenon based on knowledge creation and sharing and collective learning which obviously demands for proximity and interaction among regional firms and organisations.

Figure 3.23 – Territorial Innovation Models: theoretical roots



Source: Moulaert and Sekia (2003, p.295)

Territorial innovation models consider the role and influence of space, agglomeration of economic activities, common institutions, cooperation, collective learning and knowledge creation and

transfer in innovation processes within a geographical configuration. They embrace the broad and complex system in which firms operate.

The way through which territories and the agents located within them are organised in order to achieve competitiveness, growth and development through innovation has been the subject of study of many scholars, resulting in different approaches, theories and models. In this section, the main objective is to provide an overview of the dominant models in this field, in order to understand territorial innovation dynamics, contexts and driving forces. Moulaert and Sekia (2003) conducted an extensive survey on this matter and were able to identify the main theories and models underlying the dynamics of innovation at a territorial level. Figure 3.23 is presented as an introduction to the topic. The related main theories and models are discussed further.

These models are based on the geographical agglomeration of firms and on the uniqueness of resources and opportunities that this clustering creates within a region leading to important innovation processes at regional level. This uniqueness results from the existence and development of key conditions, such as the regional embeddedness of knowledge, interactive learning and high interaction and networking. These conditions provide high levels of specialised skills, strong knowledge bases and unique institutions, and contribute to the creation of a specific atmosphere that fosters knowledge creation and innovation.

3.5.1 Innovative milieus

The concept of innovative milieu (*milieu innovateur*) was originally developed by the GREMI (*Groupe de Recherche Européen sur les Milieux Innovateurs*) in the mid-1980's, namely through the work of Aydalot (1986), who analysed the relationships between firms, their environment and the organisation modes that characterise them. The concept was based on the endogenous nature of territorial innovation processes including economic, social, cultural and environmental factors. Such externalities contribute to the creation of a milieu that stimulates innovation and learning. This approach assumes the existence of good local institutional potential and focuses on the dynamics that make the local institutions interact and coordinate in order to create innovative firms. Aydalot stated that the behaviours that promote innovation are dependent on factors defined at local and regional level. The history of a specific region, its organisation, collective

behaviour and common internal structure are the main features of innovation. Innovative milieu theory highlights spatial proximity not in terms of physical distance (and, consequently, of related cost) reduction, but for its capacity to enable information exchange, for the similarity of cultural and psychological attitudes, frequency of interpersonal contacts and cooperation and density of factors mobility within the limits of the local area. These elements not only determine the efficiency of local production systems, but also the local response capability to changes in external environment and innovativeness (Camagni, 1991).

According to Camagni, the innovative milieu can be defined as:

> *" (…) the set, or the complex network of mainly informal social relationships on a limited geographical area, often determining a specific external 'image' and a specific internal 'representation' and sense of belonging, which enhance the local innovative capability through synergic and collective learning processes"* (Camagni, 1991, p. 3).

Following this definition, Fromhold-Eisebith (2004) argues that three main sets of elements mark the innovative milieu: effective actor relationships within a regional framework, social contacts to enhance learning processes and image and sense of belonging.

The GREMI's concept of innovative milieu stands for that the firm is not an isolated agent, it rather operates in three functional spaces: production, market and the support space, being the later constituted by three types of relations (Ratti, 1989, cit in Moulaert & Sekia, 2003; Ratti, 1992):

i. Qualified or privileged relations regarding the organisation of production factors;
ii. Strategic relations between the firm, its partners, suppliers and clients;
iii. Strategic relations with agents from the territorial environment.

According to the same author, it is the 'support space' and its dynamics that determine the relations between corporate innovation and territorial development. The milieu encompasses a relational system of the type "cooperation/competition" of local actors, combining, therefore:

- A spatial *ensemble*: it is a geographical area which has no borders set a priori, which does not corresponds to a given region, but presents a certain unity and homogeneity of behaviours and culture;

- A group of actors: firms, research institutions, local government, that must have a relative independence in terms of decision making and must be autonomous in the formulation of strategic choices;
- Material elements (firms, infrastructure), but also intangible (know-how) and institutional (diverse forms of local government or organisations with the power of decision-making);
- An interaction logic: the actors must have an interdependent relationship, which allows a better use of existing resources;
- A learning logic: a capacity built over time of actors to modify their behaviour according to changes in their environment. These learning logics may include: (i) the formation of know-how, which allows the control of production process and the creation of new products and techniques; (ii) the development of 'standards of behaviour', which carries the relationships among actors, finding a balance between cooperation and competition in order to build a shared workspace; (iii) the knowledge and the ability to identify the specific resources as an opportunity of interaction among different actors of the milieu; and (iv) the relationship that local stakeholders have with the external environment. The milieu is not isolated, it is placed in a technical and market context, that are international and in evolution (Maillat, Quévit, & Senn, 1993).

Currently, GREMI's research agenda is also focused on the concept of "apprenticeship", meaning that territorial innovative capacity will depend on the capacity of learning, as it enables the agents of the milieu to perceive changes in the environment and to adapt accordingly. This apprenticeship concept converges with the contemporary theory of "learning regions" (Camagni, 1991). The innovative milieus success will then depend on their ability to employ processes of collective learning combined with the gathering and dissemination of information at lower costs. This will result from a common cultural background that connects local agents and institutions in synergic networks (Lagendijk, 1997). Crevoisier and Maillat (1991) highlight that innovation occurs when information is brought into contact with resources and, being the milieu made up of integrated resources, innovation is the incorporation by the milieu of crucial information or resources. Therefore, it emerges as an organisation that permits innovation through the incorporation of elements which are far from each other. The elements that constitute the milieu (representations, technical culture, know-how) are redefined according to their environment and modified according to the situation. This modification is simultaneously a learning and an innovation process occurring permanently.

3.5.2 Industrial districts

The concept of industrial district appears to have been firstly used by Alfred Marshall (1890), who argues that the geographic concentration of dynamic firms leads to growth and organisational developments that enable firms to obtain external scale economies. The author highlighted the business relationships occurring within a particular region and also the importance of socio-cultural aspects. Marshall's analysis concluded that linkages and cooperation are high within the district and minimal with firms outside the region. However, the industrial district's main feature relates to the nature and quality of local labour pool, which is internal to the district and extremely flexible. The district is a stable community evolving in the same local cultural identity and sharing specialised know-how.

This model was revisited in the 1970's in the works of Bagnasco and Becattini. While analysing the dynamics that enabled the rising of industrial districts in the "Third Italy", Bagnasco (1977) compared the performance of the stagnating situation in the poor Southern Italy ("Second Italy"), the recession of the rich and early industrialised Northwest ("First Italy") and the prosperity of the firms located in the Northeast and Central Italy ("Third Italy"). The author stressed the innovative capacity of SMEs located in the same place and belonging to the same industry.

Becattini (1990, p. 112) defines industrial district as "*a socio-territorial entity which is characterised by the interactive presence of a community of people and a population of firms in one both historically and naturally bounded area*" and stresses that they can only develop if the population of firms effectively merge with the local residents, who possess social and cultural features (e.g. social values and institutions) that allow a bottom-up industrialisation process. The focus of his analysis was not only the traditional economic factors, but also the socio-cultural roots of productivity and innovativeness (Becattini, 2002). Through this idea, Becattini's work clearly moves away from Marshall's initial concept.

Moulaert and Sekia provide a useful definition of industrial districts that synthesises the main concepts formulated by Becattini, Brusco and Dei Ottati:

> *"The industrial district is commonly defined as a geographically localised productive system, based on strong local division of work between small firms specialised in different steps in the*

> *production and distribution cycle of an industrial sector, a dominant activity or a limited number of activities."* (Moulaert & Sekia, 2003, p. 291).

One of industrial districts' main characteristic is the flexible specialisation, that is, the social division of labour among firms, based on tasks and their interconnections [as conceptualised by Piore and Sabel (1984)]. The flexible specialisation concept "*was introduced as the inverse of mass production: the manufacture of specialised goods by means of general-purpose resources rather than vice-versa. Later, it was defined as a system in which firms know that they do not know precisely what they will have to produce, and further they must count on the collaboration of workers and subcontractors in meeting the market's eventual demand*" (Sabel, 1988, p. 53).

Industrial districts concentrate a large number of firms in a specific region, being each of them specialised in a particular activity (a certain phase of the production process, the acquisition of raw materials, the sale and design of products). This complementary mode of organisation demands for a qualitative and temporal *ex-ante* coordination and correspondence between the various specialised activities, which calls for great information and exchange (Dei Ottati, 1994).

The existing multiple relationships between local firms (as observed by Marshall) and between these firms and local community are based on trust and reciprocity (social proximity). The organisation mode is hybrid, set on competition and cooperation, formal and informal relations and cannot be understood if separated from the role of historical and socio-economic factors, which are crucial for the district's success (Moulaert & Sekia, 2003). Two conditions for the existence of industrial districts are a good internal (local/regional) social cohesion and consensus among local agents on a common development project. This consensus gives place to the creation of a wide sense of belonging to local community and to the regional production system (Dei Ottati, 2002). As Marshall wrote: "*The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously*".

In sum, industrial districts encompass the following features: (i) thick daily flows of large groups of people among production sites and residential sites; (ii) a main localised industry and a local community (of families and institutions) overlaps, in a way that values, attitudes and decisions of investment are guided by that industry and strategic factors relate to socio-economic relationships within the community; (iii) high division of labour among SMEs within the main

industry which is locally integrated according to defined rules and standards. There is a mix of competition and cooperation within a decentralised set of firms and centres of economic decisions; and (iv) non-dependency of external and/or larger firms (Bellandi, 1996).

The Marshallian industrial districts, as well as their Italian variation, have thus a business structure dominated by small, locally owned and embedded firms. However, Markusen (1996) rejects the "new industrial districts" approach as the dominant solution in terms of business structure. For that reason, the author presents three alternative configurations:

i. **Hub-and-Spoke**: The business structure is dominated by one or several large, vertically integrated firms surrounded by suppliers. Core firms are embedded non-locally, with substantial links to suppliers and competitors outside the district;
ii. **Satellite industrial platforms**: The business structure is dominated by large, externally owned and headquartered firms;
iii. **State-anchored Industrial Districts**: The business structure is dominated by one or several large government institutions such as military bases, state or national capitals, large public universities, surrounded by suppliers and customers.

There are some similarities between industrial districts and innovative milieus, namely the features related to the firm's support space and the role of local community, based on cooperation and complementarity among agents. However, the ID theory undertakes a deep analysis of relations of trust and opportunism, the importance of culture as a vehicle of change and the way that agents behaving incorrectly regarding the norms of interaction are penalised (Moulaert & Sekia, 2003).

An industrial district's ability to innovate highly depends on the characteristics of the social context in which production is embedded and on the willingness of skilled workers and entrepreneurs to cooperate in order to provide constant improvement and change in products and processes (Dei Ottati, 2002)[7]. Moreover, in order that cooperation and competition can lead firms to high levels of efficiency and innovation, it is necessary specific institutional support, e.g., local private and public institutions must provide socialisation in a systematic manner,

[7] It is, however, worth noting that the author refers to innovation as *'the ability to adapt production to the changing demands of the market*', which is closer to the concept of incremental innovation, rather than radical innovation where R&D plays a more significant role.

information, monitoring of opportunistic and protectionist behaviour and arbitrating disputes among local community (Dei Ottati, 1994).

Although the industrial district theory is well studied, the way in which innovation processes occur within IDs is an aspect that has been neglected in related research. Despite this, more recently, the research on the topic has widened and is placing innovation in the context of learning and adaptation and recognising the importance of formal and informal sources of innovation (Amin, 2003).

According to Bellandi (1996) industrial districts are highly successful in adjusting to gradual change in external and internal environments and have a more reduced capacity to adjust to discontinuous change. One may conclude that, as mentioned, the innovation processes that occur in IDs is mainly associated with incremental innovations, rather than with radical.

The author argues that the general characteristics of IDs are consistent with processes of innovation from bellow, or with what he calls the "decentralised industrial creativity" (DIC). This concept denotes a decentralisation of the sources of knowledge. This know-how, which belongs to local producers, is not encompassed by formal knowledge of R&D and remains the advantage of DIC, representing a potential for the development of original approaches to production and use of products. The local firm's specialisation reveals a multiplicity of specialised "know-hows" and, therefore, different approaches to innovation. The interaction of different "know-hows" promotes unique combinations of ideas related to products, processes and markets. Moreover, this physical proximity facilitates frequent face-to-face contacts which remain an effective way for communicating practical knowledge and for the interaction of approaches. It is here, however, that lays the main difficult of DIC: when it has to be complemented with the support of R&D, the production of related formal knowledge implies discontinuity with the producers' practical knowledge and bottom-up approaches. This can lead to a situation where codified knowledge is imposed, driving away the local practical knowledge that is the specific source of DIC (Bellandi, 1996).

According to Amin (2003, p. 164), "*Industrial districts are specific learning environments, equipped for continuous and incremental adaptation within given niche-markets through the mobilization of informal ties and tacit knowledge*". The informal, non-scientific and interactive knowledge play a

significant role on industrial districts' innovation dynamics. The author states that the informality that characterises the relationships occurring within the production system and local society is on the basis of these agglomerations as a particular type of innovation environment.

3.5.3 New industrial spaces

The concept of "new industrial spaces" (NIS) was developed by representatives of the Californian School by the late 1980's. The work of Storper and Scott (1988) and Scott (1988) mark the emergence of this theory, based on a logic of industrial change and combining economic geography with new developments in political science, economics and technology studies (Lagendijk, 1997).

New industrial spaces rise as a response to the decline of the rigid Fordist mass-production system. A series of changes in industrial organisation and regional growth systems was seen as an emerging paradigm of 'flexible specialisation' (Piore & Sabel, 1984). Several changes in industrial systems occurred, resulting from the crisis and decline of Fordist regime, which resulted from the capital outflow from core industrial regions, leaving behind large amounts of unemployed and fiscally ill municipalities, from the competition of Japan and other industrialised countries and from the expansion of manufacturing activities based on more flexible structures. The old regime has progressively been replaced by a new one of flexible accumulation that draws attention to *change*, namely through new forms of organisation of production, new methods of labour management and new geographical dynamics (Peck, 2003; Scott, 1988, 2004).

According to Storper and Scott (1988, p. 24), flexible production systems can be defined as "*forms of production characterized by a well developed ability both to shift promptly from one process and/or product configuration to another, and to adjust quantities of output rapidly up or down the short run without any strongly deleterious effects on levels of efficiency*". New industrial spaces are seen as densely networked centres of intensive innovation in production and labour practices (Amin, 2003).

The old Fordist system was characterised by a deskilling of labour through the defragmentation of work, while integrating the human operator into the production machinery, in order to reduce the

control over motions and rhythm of work, strong and specific lines of demarcation around each job, explicit work rules, labour control, profit seeking and strong social regulation[8] (Scott, 1988, 2004). The new industrial spaces theory reorganises the production system, focusing on a dynamic vertical disintegration, as firms are now able to enhance their flexibility and responsiveness by subcontracting several functions formerly undertaken within the firm. These flexible production systems, as stated by Peck (2003, p. 140) are seen as "*expansionist and innovation-rich*" because as the system expands into new social divisions of labour, many specialised subsectors emerge. Moreover, flexible accumulation systems, while leading to the agglomeration of firms, reduce inter-firm transaction costs (Scott, 2004). The regulation theory also provides some important inputs to NIS, as they include a social regulation system that coordinates inter-firms transactions, entrepreneurial dynamics, organises local labour markets and social reproduction of workers and provides the dynamics of community formation and social reproduction[9].

Geographically speaking, new industrial spaces are far from being attached to the old Fordist mass-production centres, as the types of inputs and labour available at these places represented no interest considering the new organisation of production systems: the high levels of worker unionisation and strongly politicised working pools (frequently characterised by rigidities in the working place and local labour market), made these old centres hostile places for the new flexible systems. Therefore, many new SMEs searched for alternative locations "uncontamined" by the old regime. As Scott argues, this situation acquires high importance, as the avoidance of rigidity and institutionalisation of flexibility are the main goals of the new regime.

Despite of the fact that NIS theory was greatly applauded for the way it linked local level organisational change to global structural change, criticisms were made to the causal mechanism of agglomeration and to the evolutionary framework. As Lagendijk refers, there was no reference to the role of space in the vertical disintegration and agglomeration process, e. g. what processes and factors result in the spatial agglomeration of economic activities. Behavioural and social

[8] Government-imposed restrictions designed to protect public interests such as health, safety, the environment, and social cohesion (OECD, 1997d).

[9] "*The interdependent reproduction both of social relations within which, and the material and discursive means through which, social life is premised, sustained and transformed over space and time*" (Johnston, Gregory, Pratt, & Watts, 2000:760)

dimensions of business dimensions were neglected and firms were reduced to passive agents of exchange (Phelps, 1992; Henry, 1992; Lovering, 1990, cit in Lagendijk, 1997).

The attention of NIS theorists soon shifted from the original structural approach based on universal causal mechanisms to the analysis of the role of culture, institutions and governance in the creation and development of new industrial spaces, moving towards a network approach not considered in the original model (Lagendijk, 1997). In this new perspective, the role of specific institutional configurations, social conventions and regional identity are recognised and the region is viewed as a crucial source of industrial dynamics and as the locus of "*untraded interdependencies, which take the form of conventions, informal rules and habits that coordinate economic actors under conditions of uncertainty*". The referred relations are assets that are specific of each region and a decisive form of geographical differentiation that determine the wealth levels and growth rates of different regions (Storper, 1997, p. 5).

Lagendijk (1997) stresses that conventions facilitate the coordination of socio-economic networks required for innovative behaviour to take place. They represent the factors of spatial ties missing in the early literature on NIS. Moreover, these "untraded dependencies" play a significant role on the process of learning, which gains even more importance if one considers that the success of the regions depends on the ability to create a supply infrastructure for learning and innovation. Unique conventions determine the way that the region generates unique responses to global challenges. New industrial spaces are set on a territory-based process of organisational feedback and learning, combined with conventions that prompt regional development.

Storper (1997, p. 136) argues that some of the more relevant conventions supporting NIS dynamism are:

- **i.** Patterns of resource mobilisation;
- **ii.** Forms of collective order in labour markets and inter-firm relations;
- **iii.** Conventions that define product quality;
- **iv.** Relations between key innovating groups and other groups in the productive system;
- **v.** Roles of regional and local third parties in harmonising preference structures;
- **vi.** Ideologies and cultures of local economic agents.

The theory on new industrial spaces presents some similarities to industrial districts, as both emphasise the vertical disintegration of production systems and the role of flexibility in territorial competitiveness and innovation. The main difference between these two approaches is that, NIS focuses on flexible accumulation and ID draws on flexible specialisation.

3.5.4 Regional technological complexes

The comparative analysis of Silicon Valley, California and Route 128, Boston developed by AnnaLee Saxenian in the early 1990's was subsequently studied by several scholars and is presently one of most cited cases of regional innovation in the related literature. Silicon Valley is part of the so-called *Holy Trinity* of regional innovation, alongside Baden-Württemberg (Germany) and Emilia-Romagna (Third Italy) (Malmberg & Maskell, 2002), regarded as archetypal in regional development. Therefore, depending on the author, perspective or approach taken, Silicon Valley is widely studied, under the label of industrial district, cluster or regional innovation system.

Bearing in mind the insights and contributions that this regional organisational model had and still has in regional development and innovation, it is separately analysed, in this work, as a "regional technological complex" (RTC). The approach to regional technological complexes was developed by Saxenian (1994) based on Storper's technology districts (Storper, 1992), Piore and Sabel (1984) and Grannovetter's (1973, 1985) networked systems and related concepts (analysed further in chapter 4, section 4.2.5). The author focused on two high-tech industrial centres: Californian Silicon Valley and Route 128 in Boston, highlighting the positive contribution of dense networks to regional innovative performance.

In her research, the author analyses the reasons explaining the continued growth of Silicon Valley's industry compared to the stagnation and decline of its Boston's counterpart in the 1970's and 1980's. Both complexes are based on linkages between university and industry that contributed to create competitive industrial regions. The research developed by Stanford University in California, and MIT in Massachusetts were the engines of innovation, providing both regions with economic development and regional growth (Etzkowitz, 2003; Varga, 2000). However, several conditions explain the observed differences (Table 3.10).

Despite the fact that both regions had universities with influential research and educational programmes in engineering, Stanford engaged in strong inter-relationships with local firms by encouraging a wider participation in its activities. MIT did not engage in this practice. Local cultures have, thus, an elevated role in regional innovation: while Silicon Valley is characterised by an open network supporting information and knowledge sharing, Route 128 fiercely tried to protect intellectual property. These different industrial structures affected the rate of regional innovation: Silicon Valley firms were able to find capital, qualified and skilled professionals with innovative ideas rapidly developed and placed into market. Horizontal coordination enabled firms to retain the focus and the flexibility needed for continuous innovation. On the contrary, in Route 128, Saxenian observed a recurrent "lock up" of vertically integrated and centralised firms' technical skills. Its vertical organisation prevented firms from keeping up to the pace of change and adapting to the markets (Saxenian, 1994).

> *"The contrasting experiences of Silicon Valley and Route 128 suggest that **industrial systems built on regional networks are more flexible and technologically dynamic** than those in which **experimentation and learning are confined to individual firms**. Silicon Valley continues to **reinvent** itself as its specialized producers **learn collectively** and adjust to one another's needs through shifting patterns of **competition and collaboration**. The separate and self-sufficient organizational structures of Route 128, in contrast, hinder adaptation by isolating the process of technological change within corporate boundaries"* (Saxenian, 1994, p. 161). [emphasis added]

Table 3.10 – Main differences between Silicon Valley and Route 128

Silicon Valley, California	Route 128, Boston, Massachusetts
▪ Networked system of balance between strong cooperation and competition	▪ Hierarchical, independent and atomised arrangement of vertically integrated firms
▪ International competition	▪ Internal competition
▪ Employees experience high support in labour mobility and creating start-ups and spin-offs	▪ Changing firms and creating new ones is infrequent and considered disloyalty
▪ Firms engaged in formal and informal cooperation (alliances, contracts, information sharing)	▪ Firms were closed in each other, secretive and independent. Lack of inter-firm contacts
▪ Blurred boundaries between firms	▪ Boundaries between firms sharply defined
▪ Continuous innovation and reinvention	▪ Lock-up and reduces rate of innovation and change

Source: based on Saxenian (1994)

3.5.5 Clusters of innovation

The concept of "cluster" was popularised by Michael Porter in the 1990's. His approach clearly derives from Marshall's work on agglomeration s of economic activities. It is though very broad and may include different perspectives, as it is often used to designate industrial districts, innovative milieus, innovation systems, networks, value chain, growth poles, etc. That is, the concept of "clusters" is somewhat fuzzy and often used to embrace all relevant mechanisms underlying regional development and localisation or agglomeration theories (Clar et al., 2008).

However, when compared to the other territorial innovation models, the cluster approach emphasises market and competition above networking and social interaction as success factors for innovation in clusters. Regional dimensions of innovation processes are only considered in a limited way. Regional innovation systems and learning regions (which are analysed in the following chapter) present a different approach, as they derive from an evolutionist perspective of economic development and institutional coordination (Moulaert & Sekia, 2003). Off all the concepts described in the previous sections, clusters present the most prominent example of how a concept can evolve rapidly and become dominant in academic research and policy-making, especially when compared to previous models which failed to have a significant impact on policy design and implementation. This occurred because clusters were able to fill in the gap between theory and practice, becoming the most applied concept of regional development and agglomeration (Lagendijk, 1997; Martin & Sunley, 2003).

Porter's widely accepted conceptualisation defines clusters as:

> "*Geographical concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions (e.g. universities, standards agencies, trade associations) in a particular field that compete but also co-operate"* (Porter, 1998b, p. 197)

This concept is strongly linked to Porter's "diamond model" of competitive advantage, which can be used to assess the overall quality of a business cluster. The diamond encompasses the determinants that influence competitive advantage: (i) factor conditions (production), (ii) firm strategy, structure and rivalry; (iii) demand conditions; (iv) related and supporting industries; (v)

government and chance (as additional determinants). The intensity of interaction within the diamond is increased if firms are also clustered or geographically localised (Porter, 1990, 1998a).

Cooperation and competition (*coopetition*) are two forces that positively collide within clusters, both extremely necessary in order to clusters to be competitive. Increased cooperation may derive from the strategic interdependence of clustered firms, as well as from the fact that there are simply more activities in which geographically close firms can cooperate. Increased competition arises because proximate competitors focus on each other to a greater extent than distant firms (Enright, 2003). According to Porter, competition and cooperation can coexist because they occur on different dimensions and among different players (Porter, 1998a)

Simmie points out a main feature of Porter's concept that distinguishes clusters from other types of agglomeration economies and may explain its popularity, which is the fact that innovation in clusters mainly results or is driven by severe national or regional competition, that is, competitiveness is a determinant notion in this approach (Porter, 1998a). Competition develops between firms linked in vertical (buying-selling relationships) or horizontal (complementary products and services) clusters (Simmie, 2004). This increased importance granted to competition highlights the role of innovation and efficiency in firm and regional competitiveness, resulting from strategic close links with buyers, suppliers and other institutions. Conversely, the previous models are less concerned with performance, productivity and competitiveness as core issues. Instead, they focus on learning, knowledge and in explaining innovation as fundamental determinants for achieving high performance, productivity levels and competitive positions. On the contrary, in clusters, innovation is more a means to an end, an input to success and competitiveness, while in the former models it is an output, a successful result of regional development organisation forms, which explains the interest in understanding innovation processes.

Bearing this in mind, one may find useful to distinguish clusters from some related, although different territorial models' concepts. Enright (1996) provides a useful distinction:

- *Industrial cluster*: set of industries related through buyer-supplier relationships or by common technologies, buyers, distribution channels or labour pools. Geographical scale is not involved. Similar to Porter's definition;

- *Regional cluster*: industrial cluster whose members are located in close geographical proximity;
- *Industrial district*: concentration of firms involved in interdependent production process within the same industry or industry segment that are embedded in local community. Geographical delimitation often corresponds to daily travel to work distances;
- *Innovative milieu*: comprises intensive linkages among organisations, especially in what concerns to knowledge creation. Terms like innovation systems, learning regions and knowledge-based clusters are frequently used in similar contexts;
- *Business networks*: firms with ongoing interaction and a certain level of independence, but that do not need to operate in related industries or be geographically concentrated.

Clusters and industrial districts have many features in common, namely the interdependence between businesses that compete and cooperate, the interaction with community and a supportive policy. However, clusters go deeper in acknowledging private sector leadership, a broader involvement of participants, stronger institutional support, attention to social structure and personal relationships and the relevance of product lifecycles (Jackson & Murphy, 2006).

Decelle (2006) believes that in tourism, one can distinguish between geographical clusters (e.g. French Riviera) and activity-based clusters (e.g. wine tourism, nature tourism, etc.). Obviously, this is a matter of positioning and image. In Portugal, some tourism clusters may be identified according to both dimensions in simultaneous, for instance, the Douro tourism cluster is associated to wine tourism, the Algarve region is related to sun, sea and sand tourism and with golf.

An additional important distinction is between networks and clusters, which are often used to describe the same phenomena. However, they present very different features distinguishing them (Table 3.11). The distinction between clusters and other models of regional development and innovation is not always easy to accomplish. The following quote may be helpful for this matter:

> *"The cluster concept focuses on the linkages and interdependencies among actors in the value chain in producing products and services and innovating. Clusters differ from other forms of co-operation and networks in that the actors involved in a cluster are linked in a value chain. The cluster concept goes beyond "simple" horizontal networks in which firms, operating on the same*

end-product market and belonging to the same industry group, co-operate on aspects such as R&D, demonstration programmes, collective marketing or purchasing policy). Clusters are often cross-sectoral (vertical and/or lateral) networks, made up of dissimilar and complementary firms specialising around a specific link or knowledge base in the value chain" (OECD, 1999a, p. 12).

Table 3.11 – Features distinguishing networks from clusters

Networks	Clusters
▪ Allow firms access to specialised services at lower cost	▪ Attract needed specialised services to a region
▪ Have restricted membership	▪ Have open 'membership'
▪ Are based on agreements	▪ Are based on social values that foster trust and encourage reciprocity
▪ Make it easier for more firms to engage in complex business	▪ Generate demand for more firms with similar and related capabilities
▪ Are based on cooperation	▪ Take booth cooperation and competition
▪ Have common business goals	▪ Have collective visions

Source: Rosenfeld (1997)

Besides the "overuse" of the concept, there are several definitions of clusters. Although Porter's appear to be the most influential in academic field and policy makers, OECD's more recent conception has emerged and is widely diffused in academic sphere (OECD, 1999a, 2001):

Clusters are characterised as networks of production of strongly interdependent firms (including specialised suppliers), knowledge producing agents (universities, research institutes, engineering companies), bridging institutions (brokers, consultants) and customers, linked to each other in a value adding producing chain" (OECD, 1999a, p. 5).

The above definition goes further into the analysis of innovative clusters, as it include of innovative firms that develop around knowledge creation and sharing infrastructures, and highly concentrated and effective links between firms, investors and researchers. This approach to innovation clusters is very similar to the one adopted by the European Commission (European Commission, 2008).

Preissl and Solimene (2003) assert that innovation clusters are a bundle of resources that constitute a potential base for innovative projects and activities. The authors also identify crucial features that comprise their definition of innovation clusters:

i. Clusters are not conceptualised as geographical agglomerations. However, it does not mean that they cannot exist in a close geographical proximity and benefit from the related advantages;

ii. Clusters are conceptualised in a sectoral perspective, relying on the notion that each industry/ cluster has its own process of knowledge creation and knowledge bases, different from other industries.

iii. Clusters contribute to innovation outcomes at collective or aggregate level, i.e., resources are mobilised between sub-sets of inter-related organisations, materialised in innovation networks.

iv. All agents contributing to innovation should be considered: universities, research organisations, firms, service providers.

Hence, compliance between the research competence fields of universities and industrial specialisations of firms located in the same region is highly necessary.

Moreno, Paci, and Usai (2006) studied the relationships between clusters and increased innovation in 175 regions from 17 European countries and concluded the following: (i) the organisation of innovation is spatially concentrated across regions; (ii) the extent and strength of spatial dependence increases over time; (iii) institutional and geographical proximity are reinforcing determinants of innovation; (iv) some externalities flow across regional borders, but not across national borders; and (v) the innovation of a given industry in a region is influenced by the degree of innovation specialisation in the same industry, but not by innovation diversity.

It is emphasised by some authors that a major limitation of the cluster theory and related empirical validation relates to the lack of geographical dimension or borders in clusters, embracing almost any distance, as long as the firms are linked with each other in relationships of cooperation and competition. This way, the concept does not provide a way of defining the spatial range of a cluster, neither which are the key dynamic processes at different geographical dimensions (Martin & Sunley, 2003; Simmie, 2004).

Porter argues that spatial clusters are the levels where externalities that support competitiveness are developed, instead of the wider and encompassing regional level. Regional success results then from the performance of specific networks and industrial configurations (Porter, 1996). However, clusters were more recently reinterpreted by other academics, such as Enright (1996, 2001, 2003), Cooke (2001) and Rosenfeld (1997) towards the inclusion of a wider environment that comprises universities, associations, research centres, etc. and thus embracing different types of collaboration relationships (Lagendijk, 1997). These new approaches are closer to innovation systems and learning regions conceptions, as they consider features such as learning abilities, skills and competencies and related interactions leading to innovation. For instance, tourism clusters are moving towards the inclusion of not only business firms or organisations, but also research institutions, training, support services or agencies, community, government, residents and other agencies (Jackson & Murphy, 2006).

A second limitation refers to the fact that the concept is 'elastic' enough to prevent the development of a universal model on how agglomeration relates to regional economic growth and it is applied so widely that its explanation of causality and determination is overly stretched, thin and fractured (Martin & Sunley, 2003).

Despite the many studies and definitions developed along the years, clusters remain a fuzzy concept used interchangeably to define an agglomeration of business. Nonetheless, they can be classified according to different criteria. For instance, Enright (2001) distinguishes clusters according to their stage of development. They can be *potential*, *latent* or *working* clusters, depending on the number of firms (critical mass) and key elements, such as the level of interaction, cooperation, competition, synergies, trust, self awareness, etc. They can also be *policy driven clusters* (chosen by governments for support but lacking a critical mass of firms or suitable conditions for development) and *"wishful thinking" clusters* (policy driven clusters that besides lacking critical mass, do not possess any source of advantage promoting development). They can also be classified by the type of product or services provided, by their specialisation in a stage of the value chain, by their geographical focus, by targeting a specific market segment or by the locational dynamics, in which *local industry cluster* serves only local markets, *natural resource dependent cluster* whose location results from the need to be close to natural resources (which is the case for most tourism destinations and products) and *traded industries clusters* that are free to choose their location according to the quality of business environment (Ketels, 2003).

The significance of space and location arises from the acknowledgement that local factors of production are used in particular places and innovation results from the ways in which these factors are utilised, combined and upgraded in those specific localities (Porter, 2001). This notion is strongly linked to tourism analysis, as the local "production factors" (tourism resources, infrastructures and facilities) are immobile and constitute the main asset of tourism destinations, which emphasises the importance of location and cooperation among firms and organisations. Furthermore, most tourism resources and attractors are public, meaning that they are freely consumed by tourists. This feature makes cooperation even more relevant in tourism industry. Within the formerly analysed territorial innovation models, the cluster model is the most applied to tourism. This happens for several reasons, among them the popularity and the widespread of the concept in both academic research and policy design by governments, due, on one hand, to its practical nature and, on the other, because it focuses on how to increase competitiveness, a genuine concern of governments and public authorities. In what specifically relates to tourism all the above mentioned reasons apply, alongside the fact that cluster analysis, unlike the other TIM's, is not so focused on manufacturing industries and production factors as a main issue, an important and competitive feature in a period of growth of services and tertiary sector when compared to industry and agriculture.

Therefore, similarly to other industries, clusters have been applied to tourism analysis, contrarily to the previously reviewed models. Porter himself recognised the importance of clusters in tourism, as the quality of visitors' experience will always depend not only of destinations' attractions, but also (or especially) on the quality and efficiency of complementary businesses such as hotels, restaurants, transportation facilities, cultural services, and so on (Porter, 1998a). Jackson and Murphy (2006, p. 1022) go even further in arguing that Porter's definition of cluster may well be used to define a tourism destination, as a '*conglomeration of competing and collaborating businesses, generally working together in associations and through partnerships marketing to put their location on the map'*. However, to claim that all tourism destinations are clusters is far from being true. When fully developed, tourism destinations may be the core of tourism clusters, but not all qualify for the level of cooperation needed, as many destinations are fragmented lacking a common vision, systemic dimension and sufficient levels of cooperation (Nordin, 2003).

Once the members of the cluster are mutually dependent (and perhaps tourism is the maximum exponent of this situation), good performance of one business can foster the success of all firms in the cluster. In Portugal, the author identified four tourism clusters in the 1990's, namely in Algarve, Lisbon Coast, South of Alentejo and Madeira Islands. Additionally, one might consider wine clusters due to their close relation to tourism and whose strategy is increasingly associated with it: Douro (Port wine), Madeira Islands, Minho and Dão (Figure 3.24).

Nowadays, the presented map may be obsolete in what concerns to most industries/ clusters, especially tourism. Regional and national tourism strategy and development has changed significantly in the last decade, alongside the alteration of national policies, government goals, regional tourism configuration, tourism funding and the increased importance of local and regional level in tourism development and planning. One may emphasise the case of Douro region (analysed further in this thesis) which, based on the wine cluster, has been experiencing an increased tourism development due to the emergence of a local cluste' formed by firms, associations and strongly supported by regional government agencies that provided tourism with technical support and funding and by academic research.

Figure 3.24 – Regional Clusters in Portugal

Source: Porter (1998b, p. 230)

Clusters have been an extremely important force in regional tourism development. Tourism stakeholders in local and regional destinations merging into organisations and associations (DMOs) for that manage, plan and promote destinations in integrated, informed and consensual paths and policies. These clusters and the resulting cooperation provide local firms and communities (usually small and medium sized tourism enterprises – SMTEs) with business opportunities, market position, image, exposure, funding and investment that would not be otherwise available.

Tourism clusters include complementary firms that collectively can deliver a bundle of attributes that create a specialised and successful regional tourism product, bringing important economic and social opportunities for communities and empowering SMTEs to compete globally by cooperating locally, instead of working in isolation (Michael, 2007; Novelli et al., 2006).

Traditional approaches to the creation of clusters considered two different types: horizontal or vertical clustering. *Horizontal* clustering, the most usual, occurs when firms from the same stage in the value chain for the same industry co-locate geographically. The firms are direct competitors, as they sell the same products and mobilise the same resources (e.g. cluster of hotels or museums). Its advantages derive from expanding potential customers to increase sales, shared information, shared infrastructure, reduction of costs, positive externalities. *Vertical* clustering takes place when firms operating at different stages of supply chain co-locate. It minimises logistics and distribution costs, concentrates labour supply, workforce skills and market information (Michael, 2007). Despite the importance of the mentioned clustering types, the author expands the categories to include *diagonal* clustering, arguing that it has increased relevance for tourism industry and destinations. It refers to a concentration of complementary firms, where each adds value to the activities of others even if the products they offer are distinct and belong to another industry. Thus, "*diagonal clustering occurs where firms working together create a bundle of separate products and services that the consumer effectively purchases as a single item. This situation is common in many tourism destinations*" (Michael, 2007, p. 26) as tourism is probably the only industry with such a diversity of sectors involved (Nordin, 2003). The co-location of complementary firms/ products from different industries has extremely positive effects in global tourism experience.

Similarly to other industries and other types of regional innovation models, tourism clusters emerge spontaneously, although subsequent public, private and institutional support are needed as determinants of competitiveness and of regional innovation patterns. Despite this, the degree of success varies among the regions, as well as the existence of prerequisites for cluster development. Usually, the areas displaying a stronger presence of these prerequisites (natural advantages, built factors, positive attitudes towards competition and competitive behaviour and interaction with other businesses) are the most innovative and economically successful (Jackson & Murphy, 2006).

Nordin (2003) argues that tourism clusters have strong linkages to other closely related industries and supporting clusters, such as food and beverage, outdoor equipment, design and so on. Therefore, linkages between tourism firms and actors from other sectors or industries are mandatory for satisfying customers, being difficult to draw the borders between two supporting clusters.

Napa Valley has been widely mentioned in the literature and recognised as a successful wine cluster, together with tourism cluster, confirming that cluster development is particularly vibrant at their intersection (Porter, 1998a). The European Cluster Observatory (2008) provides another example of this situation, by proposing that Malta's rejuvenation as a tourism destination should be accomplished through the integration of two of the main industries in the country: information technologies and tourism, generating positive synergies.

In this research perspective, these "linkages among clusters" should not be considered separately as two different entities that at some point crossed with each other generating isolated interactions. As mentioned further, tourism is a systemic industry, and every related firm, agglomeration of firms or broader environment should be considered under the same wider umbrella, where more complex and intricate processes involving organisations and institutions give rise to successful and innovative tourism destinations – the Regional Innovation Systems. These are reviewed and applied to tourism industry in detail in the following chapter.

3.6 Conclusion

In this chapter, the most relevant theories and models of innovation were reviewed. It was initially found that there are multiple approaches to the concept of innovation, according to diverse factors, and therefore it is considered differently by distinct scientific approaches, domains and even business activities. For this reason, and as in so many other issues in social sciences, there is no agreement on a definition of the phenomenon. There are, however, some terms that are frequently found in most definitions in the literature, which are, according to Baregheh et al. (2009), *newness*, *change*, *product*, *organisation*, *service*, *process* and *idea*. Nonetheless, Schumpeter's (1934) definition remains as one of the most cited, having served as the basis for the recent taxonomies proposed in the guidelines provided by the Oslo Manual (OECD, 2005). Considering Schumpeter's approach, it is worth reinforcing the idea that innovations must have economic significance and are the drivers of change and development. Besides this, it is also introduced the role of knowledge and learning as key features for successful innovation processes to occur.

Different taxonomies were studied, leading to the conclusion that innovations have different levels of importance producing diverse impacts, and also that they result from distinct factors (knowledge, markets, links, core competencies, etc.). Innovations may range from regular or incremental (less visible and with lower impacts) to radical or architectural (those that can create a new industry or reformulate an existing one). However, it should be mentioned that landmark or radical innovations represent only 10% of the overall.

The evolution of the innovation practices is also addressed. The models underlying innovation processes have changed significantly over the last decades as a result of the evolution of the socioeconomic environment, competition, market changes and of the dynamics between scientific knowledge and economic fabric. In earlier linear innovation models, innovation was seen as a sequential set of events occurring within firms, starting with R&D or market's needs as innovation sources (Rothwell, 1994). Kline and Rosenberg (1986) point out strong limitations to these linear models and, alternatively, developed the "Chain-Linked Model", and started to look at innovation as an interactive process developed within and outside the firm, linking together firms, scientific knowledge, community and the marketplace, moving thus away from linear constructs. Recent approaches consider innovation in a broader environment, as they are moving

towards concepts such as networking, knowledge creation and sharing, connectivity between firms, universities, research centres, users, suppliers, and competitors. This line of though emphasises that innovation is socially and institutionally embedded and endowed with a systemic nature. If this is valid for overall economic activities, it is even more significant in tourism, which is by nature systemic and territorially embedded.

Bearing this in mind, the main characteristics of innovation in tourism are reviewed. Research in the area is still moderate and mostly focused on micro level. The main determinants of tourism innovation are identified, and it has became evident that the phenomenon is influenced by distinct factors, some of them controllable, internal to the firm and easily implemented, while others are unpredictable in nature, mainly because they are external to the firm and thus their implementation involves more complex processes and higher risks. It is clear that, in order to be innovative and competitive, tourism firms should engage in several changes or assure the introduction of new practices concerning their management processes, human resources, internal competencies, knowledge sources and cooperation, as well as they should monitor and be proactive towards external market forces. Several barriers are also identified. These may relate with industry specific features and firms' internal or external factors.

Considering the obstacles to tourism innovation alongside the nature and specific characteristics of the tourism industry, it is found that economic agglomerations generate important externalities that may help to overcome the factors that hamper innovative practices. These clustered economic structures based on proximity and networked relationships confirm the importance of regional-level innovation developed within collaborative arrangements. Within this context, territorial innovation models have gained increased importance and the most relevant models and theories are approached.

Despite the importance and contributions provided by each of these approaches to territorial innovation, it is concluded that regional innovation systems may be the model that better fit tourism innovation. This model is thoroughly analysed in all its dimensions and applied to tourism in the following chapter.

Chapter 4

Progressing on regional tourism innovation

4.1 Introduction

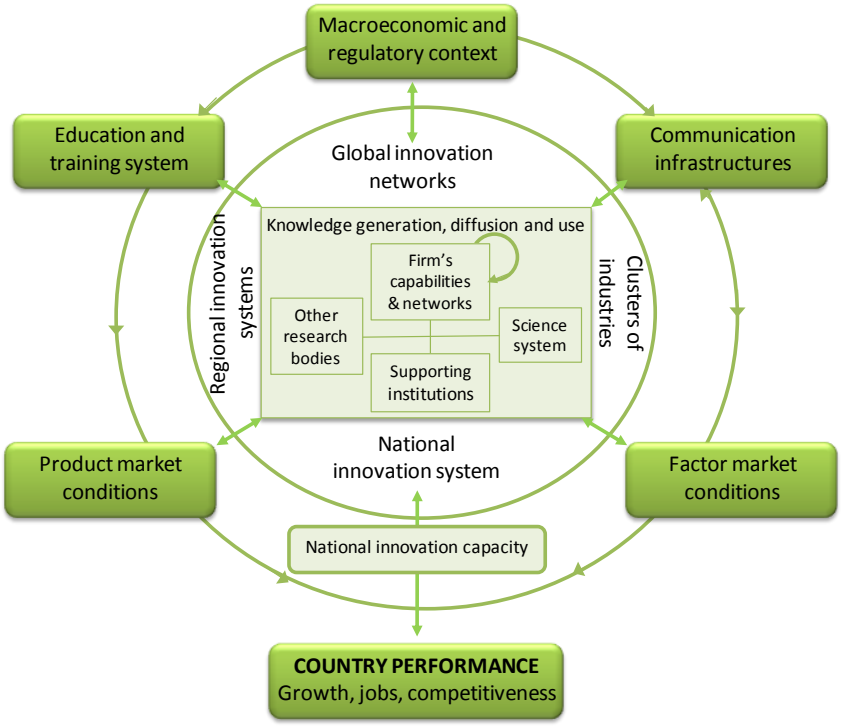
In the previous chapter, the theoretical background of general innovation, tourism innovation and territorial innovation models are discussed. It is concluded that innovation, particularly in tourism, is strongly influenced by the conditions provided by the territory or region where firms are located and where (and if) they constitute an economic agglomeration. Thus, exchange and relationships of several types among firms and/or organisations, as well as regional conditions, are of paramount importance for successful and competitive innovative processes. If this is true for overall economic activities, it gains an increased relevance in tourism. The analysis of territorial innovation theories pointed us to the regional innovation systems as being the most adequate and fruitful for model tourism innovation.

This chapter offers a comprehensive review of regional innovation systems (section 4.2), analysing its components and their roles (section 4.2.1), the systemic perspective of innovation and its close relation to the approach of tourism as a system (section 4.2.2) and the functions that regional innovation systems may perform (section 4.3.3). An important discussion, which makes sense within the topic of regional innovation systems, but also in what concerns tourism destinations' governance and management, is the issue of the boundaries of tourism territories. As concluded in the earlier chapter, the region is the privileged locus for innovation to develop. But how should tourism regions be defined? What criteria should be used in order to define regions that are effectively functional and have the necessary dynamics to successfully develop systemic innovation? This discussion takes place in section 4.2.4. Systemic innovation occurs due to a strong pattern of relationships among firms and/ or organisations. It may thus be said that networks are the core of regional innovation systems, as one may consider that they operationalise this territorial innovation model. Several theories contribute to the current state of the art of social network analyses. Considering their relevance for both the theoretical background and the empirical study of this thesis, they are thoroughly analysed in section 4.2.5. The final dimension of regional innovation systems is knowledge. Knowledge creation and sharing are fundamental processes, being the main pillars of innovation. The dynamics related to knowledge and learning regions are therefore considered (sections 4.2.5 and 4.2.6). The chapter is completed with the application of regional innovation systems model to tourism destinations (section 4.3).

4.2 Conceptualising regional innovation systems

The innovation systems approach emerged in the 1990's focusing on national level with the National Systems of Innovation (NSI) theory. The earliest versions of the concept report to Freeman (1987), Lundvall (1992), Nelson (1993) and later to Edquist (1997). The NSI concept arises as a criticism to national economic policies considering that international competitiveness was gained through the reduction of national wages or through devaluing national currencies. Processes regarding intangible assets such as innovation and learning were totally absent from the analysis of economic growth and development. In addition, the recognition of several empirical studies demonstrating that innovation is mainly an interactive process (Lundvall, 2007), [e.g. Rothwell (1994) and Kline and Rosenberg (1986)] generated by inter-firm and inter-institutional relationships and that, in this context, "*the most fundamental resource in the modern economy is knowledge and, accordingly, the most important process is learning*", (Lundvall, 1992, p. 1) formed the basis for the analysis of innovation as systemic in its nature. Accordingly, innovation is then understood as socially and territorially embedded, based on interactive learning and shaped by the institutional and cultural context.

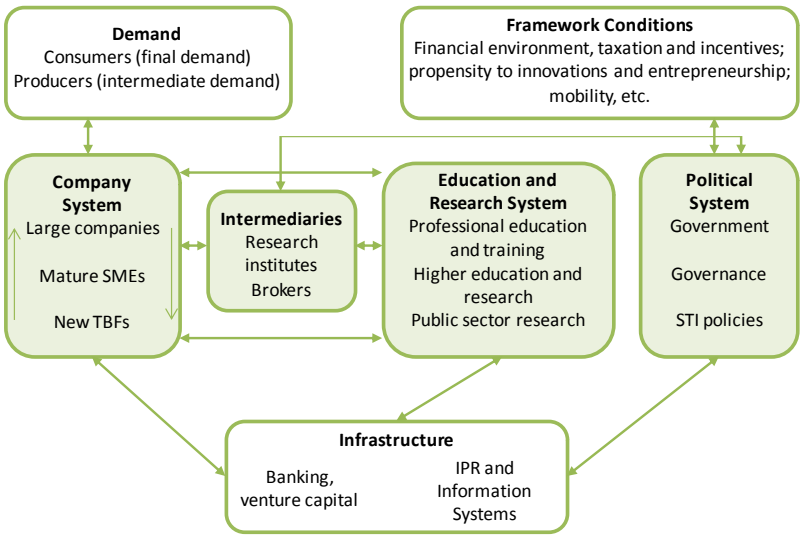
Figure 4.1 – Actors and linkages in National Innovation Systems – a general framework



Source: OECD (1999b)

Despite the fact that there is not a generally accepted definition of National Innovation Systems, some conceptualisations of the term have been developed. Freeman (1987, p. 1) addresses it as "*the **network** of institutions in the public and private sectors whose activities and interactions imitate, import, modify and diffuse new technologies*". Lundvall establishes a distinction between a broad and narrow definition of NSI. While the broad definition regards NIS as including "*all parts and aspects of the economic structure and the institutional set-up affecting learning as well as searching and exploring – the production system, the marketing system and the system of finance present themselves as sub-systems in which learning takes place"* and "*constituted by **elements** and **relationships** which interact in the production, diffusion and use of new and economically useful **knowledge***", the narrow definition focuses on the "***organisations** and **institutions** involved in searching and exploring – such as R&D departments, technological institutes and universities*" (Lundvall, 1992, pp. 12-13), highlighting the role of the research subsystem. It appears that the broad definition seems to be more in line with the overall concept of innovation systems, as it includes several elements involved, rather than only the scientific knowledge producers. On its turn, Edquist (1997) refers that national systems of innovation should include all factors influencing the development, diffusion and utilisation of innovations and that these may be of economic, social, political, organisational and institutional nature as well as the relationships among them.

Figure 4.2 – Generic National Innovation System



Source: Arnold and Kuhlmann (2001, p. 2)

The innovation systems theory is then based on the interactive model of innovation. The capacity to innovate depends not only on the individual performance of organisations or their simple existence in an aggregative way, but how they interact with each other within the innovation system (Cooke, 1998; Gregersen & Johnson, 1997).

Despite the fact that there is not a single globally accepted model of an innovation system (regardless of the geographical level of analysis), as the conditions on which territories organise themselves in order to innovate are dependent on institutional, social and cultural dimensions that are unique and characteristic of (or embedded in) each location, some strengths may be pointed to its general framework (Edquist, 2006):

- Innovation and learning are at the centre of the framework, because innovation is understood as the production of new knowledge or as the combination of existing knowledge in new ways;
- It is characterised by an holistic and interdisciplinary perspective, as it includes all determinants of innovation, as well as economic, social, political and organisational factors;
- It employs evolutionary and historical perspectives. Innovation develops over time and is influenced by many factors and feedback processes;
- Emphasises interdependence and non-linearity: as already referred, firms innovate through interaction with other organisations. These relations are reciprocal and based on feedback. Moreover, innovation processes are shaped not only by the system's components, but also by the relationships among them;
- The innovation systems approach encompasses product and process innovation and also their subcategories (service/ product innovation, organisational and process innovation);
- It considers the role of institutions, as they highly influence the way innovation occurs.

In order to understand the regional innovation system's framework it is, first of all, useful to understand how systems are defined, generally speaking. A broad definition is the one of Boulding (1985, cit in Lundvall, 1992) that says that a system is "anything that is not chaos". The word "system" seems to have its origins on Greek, defining a connected or regular whole. Skyttner synthesises several perspectives on the definition of systems and concludes that a system is an "*organised whole in which parts are related together, which generates emergent properties and has some purpose*" (Skyttner, 2005, p. 58). He emphasises that a group of

elements, in order to be classified a system, needs to have a kind of functional division and labour co-ordination among its parts, that is, it has to be *organised*. Otherwise, that set of elements will only form an *aggregate*. Ackoff (1981) defines system as a set of two or more elements that must fulfil three conditions: i) the behaviour of each element affects the behaviour of the whole; ii) the behaviour of the elements and their effects on the whole are interdependent; and iii) however subgroups of the elements are formed, each has an effect on the behaviour of the whole and none has an independent effect on it. In sum, a system is a whole that cannot be divided into independent parts, and from here derives two of the most important propositions of systems: every part of a system has properties that would extinguish if that part is separated from the whole, and every system has some properties that none of its parts, individually, do.

Innovation systems theory applies to other levels of analysis, or boundaries, rather than national ones. Carlsson (1995) focused on "technological systems", defending that each technology field has a unique innovation system with specific networks of agents, knowledge basis and institutional infrastructures. The "sectoral systems of innovation" were developed on the assumption that the organisation of innovative activities, the rate and type of innovation and the used technologies significantly differ across sectors (Breschi & Malerba, 1997).

The regional innovation systems (RIS) concept was first introduced by Philip Cooke in 1992 and this framework is nowadays widely used by several academics when studying innovation processes in regional economies (Asheim & Coenen, 2004; Asheim & Isaksen, 1996; Braczyk, Cooke, & Heidenreich, 1998; Cooke, 2001; Cooke, Gomez Uranga, & Etxebarria, 1998; Doloreux, 2004; Landabaso, Oughton, & Morgan, 1999, among others). This systemic approach to regional innovation results from the evidence of several studies that highlighted the importance of regional level in economic development. The argument that geographic proximity between organisations facilitates the creation and transfer of knowledge through networking, personal relationships, local collective learning processes and the existence of a "sticky" knowledge present in social relations (Asheim, Coenen, & Svensson-Henning, 2003; Asheim & Isaksen, 2002), contributed to the development of the regional innovation systems theory. Furthermore, each region may be characterised by having specific and embedded routines, norms and traditions that play a fundamental role on the way organisations interact and cooperate with each other in order to innovate. Geographic distance usually decreases the intensity and frequency of interaction among them. Bearing this in mind, and considering the social character of innovation and

learning, these processes are best achieved when actors are close enough to have frequent and personal interaction (Asheim, 2002).

Similar approaches based on these regional dynamics can be found in the post-Fordist economic models such as industrial districts, innovative milieus, regional clusters and new industrial spaces models, reviewed in the previous chapter. Some of their most important characteristics certainly contributed to Regional Innovation Systems approach and can be found in this framework.

Regional innovation systems acknowledge the most important features of national innovation systems (NIS), namely that innovation and learning are social and interactive processes (Lundvall, 1992; Lundvall & Borrás, 1997). However, within RIS, these processes are as well considered to be spatially bounded and territorially-embedded, based on regional resources and capabilities and on social and institutional contexts that are place-specific (Asheim, 2002; Cooke, Gomez Uranga, & Etxebarria, 1997; Maillat, 1993; Storper, 1997).

Building on Howells' (1999) and Evangelista, Iammarino, Mastrostefano, and Silvani's (2002) work, the top-down approach of RIS argues that some of NIS main features can be applied to sub-national levels, obviously adapting them to the characteristics of a smaller territorial scale:

- Internal organisation of firms;
- Inter-firm relationships;
- Role of public sector;
- Institutional set-up of financial sector;
- R&D intensity and organisation;
- Institutional framework (namely regional governance);
- Attributes of the production system and sectoral specialisation;
- Degree of openness and capacity to attract and absorb external resources;
- Core/periphery hierarchical forces (history, geography, etc).

The origin of RIS can thus be found on two main fields of research: i) systems of innovation (where innovation is considered to be an evolutionary and social process, influenced by a significant number of internal and external factors and based on collective learning processes resulting from collaborations with other actors); and ii) regional science (namely agglomeration theories), where innovation is viewed as a localised and socially and territorially embedded

process (Asheim et al., 2003; Asheim & Isaksen, 1997; Doloreux & Parto, 2005). In this context, proximity, local rules, norms, conventions, externalities and spillovers are emphasised as fundamental shapers of innovation.

Within this context, Gertler (1997) emphasises the geographical nature of innovation processes that occurs due to three main reasons. First, and as also referred by Asheim (2002), spatial proximity increases frequent, close and face-to-face learning-by-interaction. Second, regionally clustered firms share a common regional culture that can facilitate social learning (especially when the shared knowledge is tacit). Third, this common language is supported by the creation of regional institutions that help to establish local rules and norms that regulate firms' behaviour and interaction.

This way, it can be assumed that there are features which are localised, region-specific and relevant for RIS within a bottom-up approach, namely: communication patterns at individual or group level concerning innovation processes, search procedures related to innovation, learning patterns, knowledge sharing, innovation performance and territorial spillovers (Howells, 1999).

The cultural aspects of RIS more closely linked to a strong innovation system (regarding, essentially, the quality of the interactions developed within the regional economy) were reviewed by Cooke et al. (1997, p. 488) and relate to a culture of cooperation, association, learning and production, to the existence of experience and capacity to incorporate institutional changes, coordination and consensus between private and public sectors, interface mechanisms in fields such as scientific, technological, productive and financial, different types of learning capacities; valorisation of the use of science and the existence of linkages between universities and an educational/ training system and the productive system.

A regional innovation system can thus be defined as a system in which "*firms and other organisations are systematically engaged in interactive learning through an institutional milieu characterised by embeddedness*" (Cooke et al., 1998, p. 1581). These organisations interact within public and private interests according to organisational and institutional relationships that lead to the generation, use and dissemination of knowledge (Doloreux, 2003). Conceptually speaking, RIS embrace five key and related concepts: region, innovation, network, learning and interaction (Cooke, 2001).

But which elements comprise a regional innovation system? What are they made of and what happens within these systems in terms of innovation dynamics? According to several authors, there is no single framework of RIS. This occurs because of the uniqueness of each region in terms of actors, economic organisation, institutions, resources, policies and capabilities. However, some criteria must be verified in order to a regional economy develop a system of innovation.

Table 4.1 – Criteria for higher and lower potential of Regional Innovation Systems

Higher RSI Potential	Lower RSI Potential
Infrastructural Level	
▪ Autonomous taxing and spending ▪ Regional private finance ▪ Policy influence on infrastructure ▪ Regional university-industry strategy	▪ Decentralised spending ▪ National finance organisation ▪ Limited influence on infrastructure ▪ Piecemeal innovation projects
Superstructural Level	
Institutional Dimension	
▪ Co-operative culture ▪ Interactive learning ▪ Associative-consensus	▪ Competitive culture ▪ Individualistic ▪ Institutional dissension
Organisational Dimension (firms)	
▪ Harmonious labour relations ▪ Worker mentoring ▪ Externalisation ▪ Interactive innovation	▪ Antagonistic labour relations ▪ Self-acquired skills ▪ Internalisation ▪ Stand alone R&D
Organisational Dimension (policy)	
▪ Inclusive ▪ Monitoring ▪ Consultative ▪ Networking	▪ Exclusive ▪ Reacting ▪ Authoritative ▪ Hierarchical

Source: Cooke (2001, p. 961)

Bearing this in mind, Cooke (2001) and Cooke et al. (1997) expanded on what they considered to be the key organisational and institutional dimensions that conduct to strong and weak RIS potential (Table 4.1). The criteria for regional systemic innovation can be classified as infrastructural and superstructural, the later including the institutional and organisational dimensions at firm and policy level.

The above mentioned elements relate to some of the features and dynamics that should be verified in functioning regional innovation systems (considering the relationships among their elements). But the analysis of RIS in terms of its structure and operational parts is of fundamental importance in order to understand this framework, both in theory and in practice.

Inglestam (2002, cit in Edquist, 2006) claims that systems integrate two **constituents**: **components** and the **relationships** among them, they must always have a **function** (performing something) and they must have **boundaries** that allow distinguishing them from the rest of the world.

4.2.1 Components of regional innovation systems

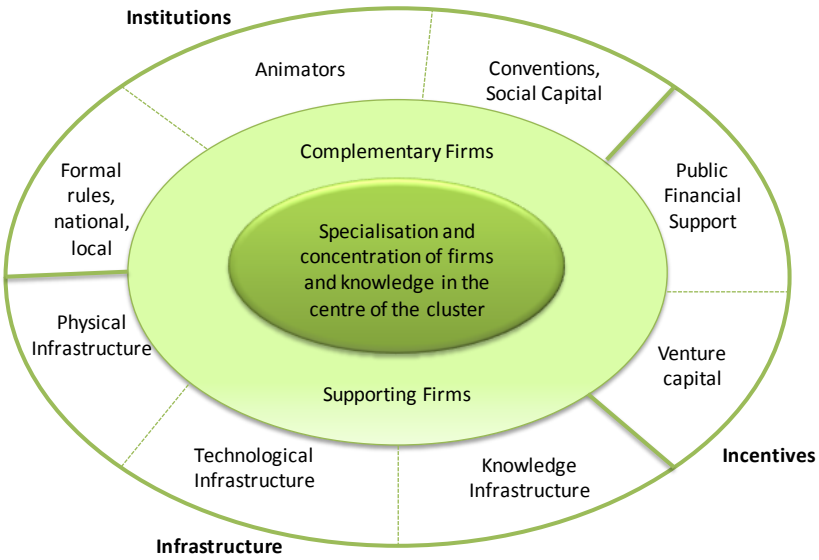
Innovation systems' components can be regarded as their "'operating parts" (Carlsson, Jacobsson, Holmén, & Rickne, 2002). That is, the parts that, through the ongoing relationships among themselves, contribute to the systems overall functions and goals. To Carlsson and Stankiewicz (1991), an innovation system's components are the actors, networks and institutions that contribute to the overall function of innovating.

Actors (or **organisations**) and **institutions** as the main components of innovation systems are thoroughly analysed by Edquist (1997, 2006), and especially Edquist and Johnson (1997), who make an important and detailed contribution in distinguishing them, in understanding their functions and the relations between them. Despite the fact that networks play a fundamental part of innovation systems, they can hardly be seen a component. Instead, they are the basis of the linkages and interaction between organisations and institutions, whose ultimate output is the production, diffusion and use of innovations. They represent the dynamics of an innovation system (networks are further analysed in section 4.2.5).

Organisations may be defined as formal structures that are created consciously and with an explicit purpose. They are players or actors of an innovation system (Edquist & Johnson, 1997). They can comprise firms (users, producers, suppliers) or non-firm organisations such as universities, research centres, financial institutions, government agencies, associations, trade unions, and can include sub-units of larger organisations (e.g. in the form of their R&D

departments) and groups of organisations (industry associations). These agents are characterised by particular learning processes, competences, beliefs, goals, organisational structures and behaviours (Malerba, 2005). North goes further and defines organisations according to their political nature (political parties, city councils, regulatory boards), economic nature (firms, trade unions, cooperatives), social nature (churches, clubs, athletic associations) and educational nature (schools, universities, training centres) and claims that "*they are groups of individuals bound by some common purpose to achieve objectives*" (North, 1990, p. 5).

Figure 4.3 – Components of a Regional Innovation System



Source: Eriksson, 2000 *cit in* Andersson and Karlsson (2004, p. 12)

Cooke et al. (1997) consider that, in abstract, it is possible to model an innovation system according to its key organisational elements: university research, research institutes, technology-transfer agencies, consultants, skills-development organisations, public and private funding organisations and firms, large and small, plus non-firm organisations involved in innovation.

Organisations (public or private) are the main vehicles for innovation. In this context, innovative organisations must assure the existence of some core competencies related to a routine in searching and using new knowledge, to the absorption of new knowledge created outside the organisation and to the stimulation of the emergence and use of unexpected new knowledge (Edquist & Johnson, 1997).

It is important, within this context, to distinguish the role played by non-profit organisations (also referred to as hard institutions). While firms are usually the creators of innovations and place them into the market, non-profit organisations provide innovation support and funding and may be co-creators or co-developers of innovation. Together, they configure a formation similar to the *space de supporte* characteristic of innovative milieus and endow regions with institutional thickness, bringing a higher capacity to adapt to a changing environment and to innovate (Amin & Thrift, 1995).

While organisations are "players", **institutions** are the "*rules of the game*" They shape human interaction and "*reduce uncertainty by providing a structure to everyday life*" (North, 1990, p. 3). Institutions are resilient social structures, transmitted across generations and based on rules, norms, cultural beliefs, common habits, established practices, laws, standards, etc. Institutions emerge or are imposed by interaction among people or groups of people and therefore are preserved and modified by human behaviour (Malerba, 2005; Scott, 2001). By means of structuring political, economic and social interactions, institutions can be both formal and informal. Formal institutions relate to laws, constitutions, property rights, regulations, patent laws. Informal institutions comprise traditions, conventions, sanctions, taboos, customs, codes of conduct, etc. (North, 1991).

If innovation results from interactive, social and cumulative learning processes, and if institutions shape and constrain interaction and social behaviour, they will obviously affect innovation. Within this context of interactive learning, Edquist and Johnson provide a definition of institutions that sets the link between them and innovations: "*Institutions are sets of common habits, routines, established practices, rules, or laws that regulate the relations and interactions between individuals and groups*" (1997, p. 46). Furthermore, the authors claim that institutions play important functions concerning the development of systemic innovation, namely by:

- **i.** The reduction of uncertainty by providing information about the behaviour of other people or by reducing the amount of information needed;
- **ii.** The management of conflicts and cooperation;
- **iii.** The provision of incentives to innovation, learning, knowledge diffusion and collective entrepreneurship;
- **iv.** The channelling of resources to innovation activities by supporting R&D, allocating resources to research centres, informal routines of establishment of R&D departments.

Organisations are thus highly influenced by institutions because they are embedded in an institutional context. But institutions are also embedded in organisations. There is a relationship of mutual embeddedness which influences innovations systems' performance. For instance, often organisations create institutions, e.g. by formulating policies that, by repeated implementation, assume an institutional nature (Edquist & Johnson, 1997).

The meaning of "institution" is, however, blurred, as the concept is used to address both concrete things, i.e., organisations, and intangible things that shape human behaviour (norms, routines, habits). In order to avoid this ambiguity, Cooke and Morgan classify them into *hard* and *soft* institutions (Cooke & Morgan, 1998). While hard institutions are responsible for the effective introduction of innovation in the system, soft institutions influence the way that systems operate and the elements that interact within systemic innovation processes. Hard institutions are thereby embedded in soft institutions.

Different innovation systems will obviously present different components regarding their structure, roles, configuration and the way they relate to each other. For instance, in some innovation systems, the most significant R&D may be performed by universities, while in others it may be carried out by firms' research departments (Edquist, 2006). Institutions (formal and informal) are very different between countries or even regions within the same country, which may affect differently the way knowledge creation and transfer occur (and, consequently, innovation), in result of dissimilar types of relationships among agents.

This difference that can be verified among regional innovation systems can be analysed through different typologies of RIS. Cooke (1998) proposes a classification according to two fundamental dimensions of regional innovation: governance infrastructure and business superstructure. In what concerns the government dimension, three models are conceptualised. The *grassroots* RIS main feature is the local organisation and support of innovation initiatives. Supra-local intervention is low or absent in result of the localised nature of coordination of the regional innovation system. Asheim and Isaksen (2002), in their own classification of RIS, call this type the *territorially embedded regional innovation system*, emphasising that innovation results from highly localised inter-firm learning based on geographic and relational proximity. They furthermore recognise that direct interaction with knowledge producers (such as universities and R&D institutes) is low as innovation and learning are based on synthetic (tacit) knowledge.

According to Cooke (1998), North Italian Industrial Districts and Silicon Valley high-tech complex are good examples of this model.

The *networked RIS* (Cooke, 1998) or the *regionally networked RIS* (Asheim & Isaksen, 2002) is considered by the later authors to be the ideal type of a regional innovation system, as it is based on a regional cluster of firms supported by an institutional infrastructure. Organisations are embedded in their region and engaged in processes of localised interactive learning. Systemic regional innovation is more planned and set on public and private cooperation, which strengths regional institutional infrastructure (Asheim & Isaksen, 2002). Innovation initiatives can result from the cooperation among agents of local, regional, national and supranational levels. Research is a mixture of 'pure and applied' and 'near market' activities, in an adequate combination of tacit and scientific knowledge. There is a high level of interaction among research community, government and firms (Cooke, 1998.), the foundation of the triple helix concept (Etzkowitz, 2003). The cooperation with universities and R&D institutes can improve the RIS's knowledge base, by supplementing local competences and informal/tacit knowledge with new scientific knowledge. This will increase the clusters' innovative capacity and their ability to develop radical innovations, as well as to avoid lock-in situations within clusters because, on the long term, firms need to expand their localised learning or it will become obsolete (Asheim & Isaksen, 2002).

Finally, within the *dirigiste* (Cooke, 1998.) or *regionalised national innovation systems* (Asheim & Isaksen, 2002) innovation is planned and coordinated from or with agents from outside the region, usually resulting from central government policies, which leads to a high level of coordination of innovation activities, as it is conducted by the state. Research is directed to the needs of larger or state owned companies located in or outside the region (Cooke, 1998). This model complies with the narrower definition of innovation systems and with the linear model of innovation, since R&D resulting from universities and research centres play a main role, and cooperation regards especially the development of radical innovations based on scientific knowledge (Asheim & Isaksen, 2002). There is, in this type of RIS, a general lack of regional embeddedness and reduced linkages and cooperation with local firms and organisations. This is the case of science parks and technopoles, created by central government initiatives and that, due to their characteristics, are usually unable to develop innovative networks based on inter-firm cooperation and interactive learning, both within the science park or technopole and with local industry (Asheim & Cooke, 1998).

The business dimension transmits the "*posture of firms in regional economy, both towards each other and the outside world*" and it is important because it provides the soft infrastructure that supports firms' innovation (Cooke, 1998, p. 21). Three models result from this approach: first, the *localist RIS*, when we are facing the domination of a large firm towards few or small indigenous firms and few large branches of external enterprises. In what concerns research, there may be local organisations capable of combining with clustered firms within the region. The level of association is high. Second, the *interactive RIS*, where there is a balance between large and small firms and of private and public research institutes and where the associative level is also high. Third, the *globalised RIS* is dominated by a global corporation which is supported by local, dependent SMEs. Research is internal to the company and association degree is influenced by the needs of larger firms (Cooke, 1998).

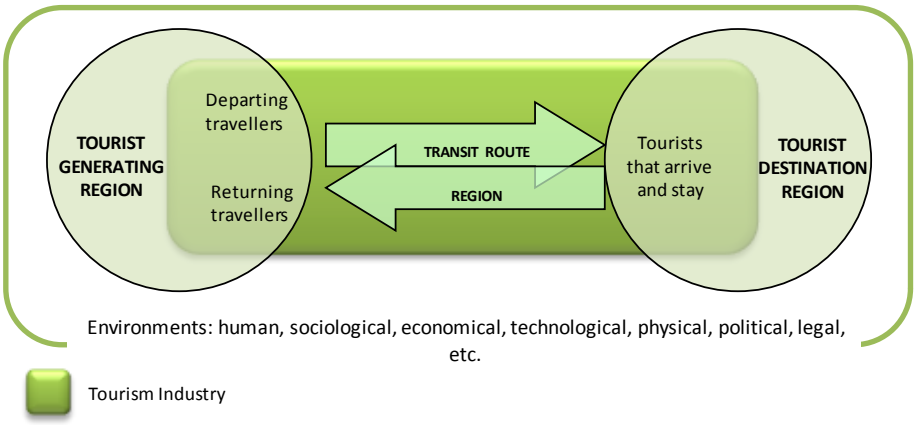
4.2.2 Tourism as a system

Tourism is composed by a set of interconnected, interdependent and interacting firms, organisations and institutions and therefore it cannot be defined as a simple industry. Thus, the systemic approach seems to be a suitable premise in analysing and conceptualising the phenomenon. As previously stated, a system is an indivisible whole with specific properties that none of its parts separately have. The behaviour of each element of the system will affect the other parts and the entire system as well (Ackoff, 1981). Bonetti et al. (2006, p. 111) consider that the tourism system's territorial dimension is "*capable of enhancing the surplus value which can be generated by a destination as a whole*" and may cover "*the evolutionary process which makes possible for a specific area to modify its vocation over time and express it by generating new products*", that is, to develop significant innovation processes. Thus, approaching tourism destinations as systems: (i) helps to understand the dynamics and synergies between the elements and sub-sectors comprising it; (ii) once tourism is an open system, because it interacts with other environments or systems (Skyttner, 2005) and is continuously changing, it allows to analyse these broader interactions; (iii) by furthering knowledge about how tourism destinations operate, it brings important insights to destination management, planning, collective learning and innovation development; (iv) fosters collective action towards commonly defined plans, actions and decisions; and (v) allows the analysis of tourism destinations' evolutionary process as a whole

and thus to understand and design innovation processes that prevent destinations to reach stagnation and decline stages as predicted by Butler (1980).

Leiper (1979) developed the first and one of the most cited models of tourism as a system (Figure 4.4). This system involves the travel and temporary staying of people in places different from their usual residence for one or more nights. It is composed by five distinct elements: tourists, tourist generating region, transit route region, tourist destination region and tourism industry. By being an open system, the organisation of these five elements interacts (affects and is affected by) with other environments, such as human, sociological, economical, technological, political, etc. The author also emphasises that, within a destination, there may be several sub-systems corresponding to different products or sub-sectors (accommodation, restaurants, travel agencies and so on).

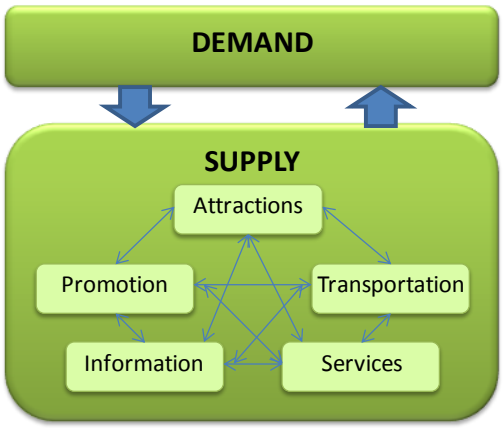
Figure 4.4 – Leiper's tourism system



Source: Leiper, (1979, p. 404)

Gun and Var's (1994) understanding of tourism systems includes two broad interacting dimensions, *demand* and *supply*. The interaction between tourists and tourism supply will influence the subsequent development and interaction between the elements of supply which are: attractions, transportation, services, information and promotion. These elements will be part of tourism products and destinations, provided that they systematically interact with each other (Figure 4.5).

Figure 4.5 – Elements of tourism system according to Gunn and Var



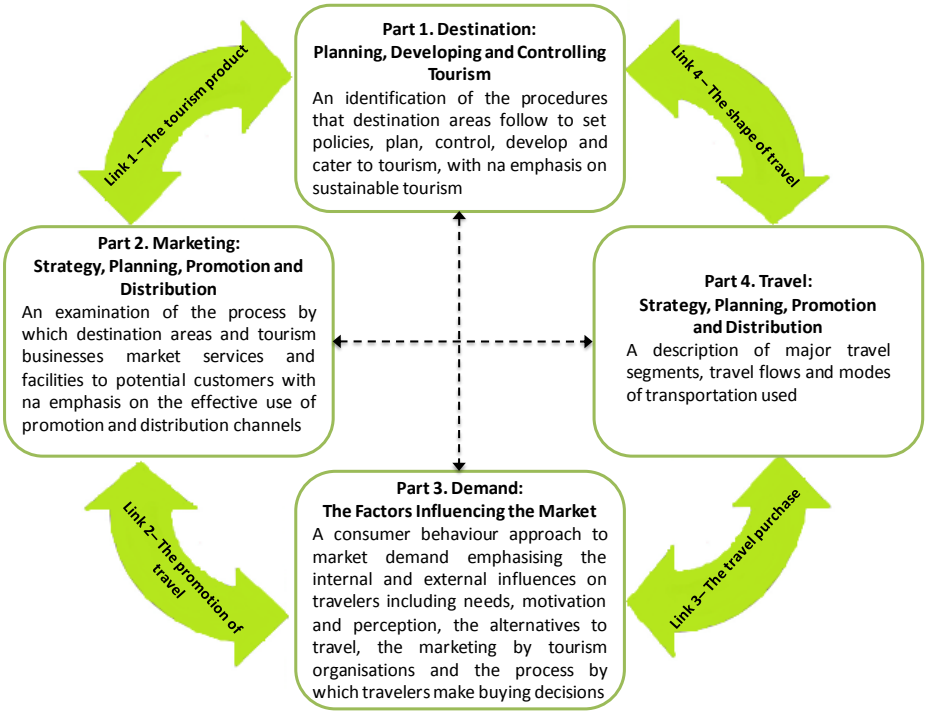
Source: Gunn and Var (1994, p. 34)

This model is rather simple and its systemic level is far from complete, as it lacks extremely important dimensions in tourism systems: the territory, or a geographical element (overall destination), local communities, a broader economic and business dimension and the interaction between tourism and other systems or other industries. Its systemic perspective appears to be present only in the arrows that connect the different elements, and not by providing the full picture of the elements and interactions that develop within tourism destinations.

Mill and Morrison's model (Figure 4.6) appears to be more comprehensive, consisting in four components: (i) destination; (ii) travel; (iii) demand; and (iv) marketing. This approach provides a wider perspective on the several components that should interact so that the tourism system operates successfully, as a functional region. It comprises the linkages between the destination's characteristics and procedures in terms of planning, developing and controlling tourism industry, the marketing efforts in order to promote and distribute the tourism product, the forces that influence tourism demand, their needs, motivations and consumption behaviour, the travel purchase, the strategy and planning of the travel and ultimately, the shape of travel itself, which is influenced by the destination.

Despite being far more complete than Gun and Var's approach, this model is mainly focused on market forces, marketing issues, such as tourists' behaviour, motivations and travel decisions, promotion and distribution, and presents low emphasis on the territory, local communities and other systems interacting with tourism system. Also, the economic perspective, network interactions, information and knowledge dimensions are lacking.

Figure 4.6 – Mill and Morrison's systemic perspective on tourism



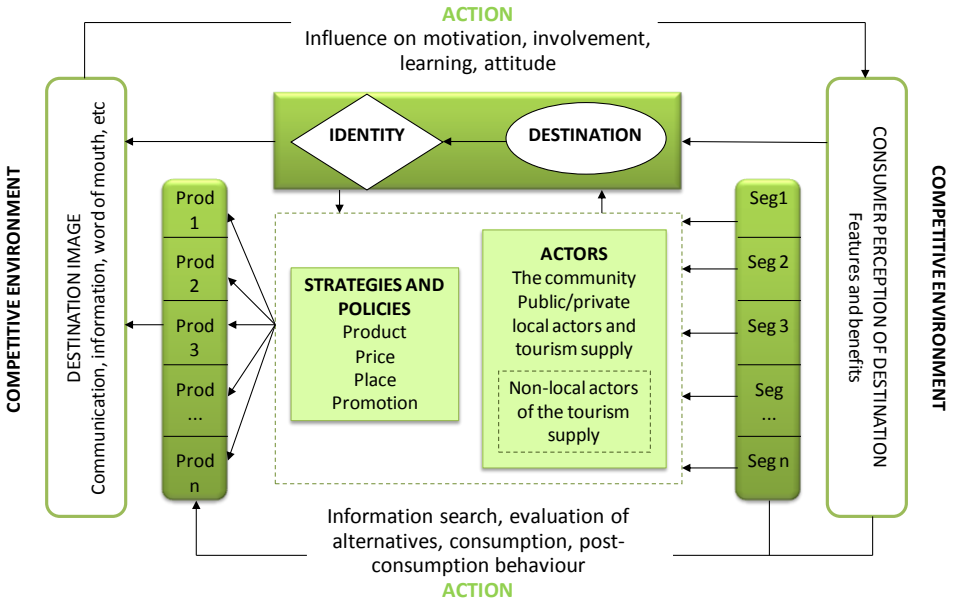
Source: Mill and Morrison (1985)

The systemic view of tourism also implies that the presence of several and distinct stakeholders interacting with and within the destination, each with different goals and perspectives, makes difficult to coherently plan the destination's tourist development. Thus, the key is to match the variety of interests, goals and products with the destinations' identity (which is partly made of local community, institutions and economic structure), in order to create an integrated system (Figure 4.7).

It is therefore necessary to understand the interactions among stakeholders and also: (i) the effects that the wider competitive environment (comprising several different systems: political, social, technological and so on) has on tourism destinations, (ii) the tourism resources and their potential and to consider how these are managed, planed and organised, (iii) to recognise what are the stakeholders' expectations regarding tourism system's outputs; and (iv) to acknowledge that tourism destinations comprise local actors (community, public or private organisations, firms) and links to external actors whose strategies and policies influence the destination's management and development (Manente & Minghetti, 2006). It is also important to note that tourism resources are fundamental parts of the system, and that the amplitude of each one to generate

value and innovation is correlated to its level of integration in the system and to the relationships between the different organisations that improve and enhance local resources (Bonetti et al., 2006)

Figure 4.7 – The destination system



Source: Manente and Minghetti (2006, p. 231)

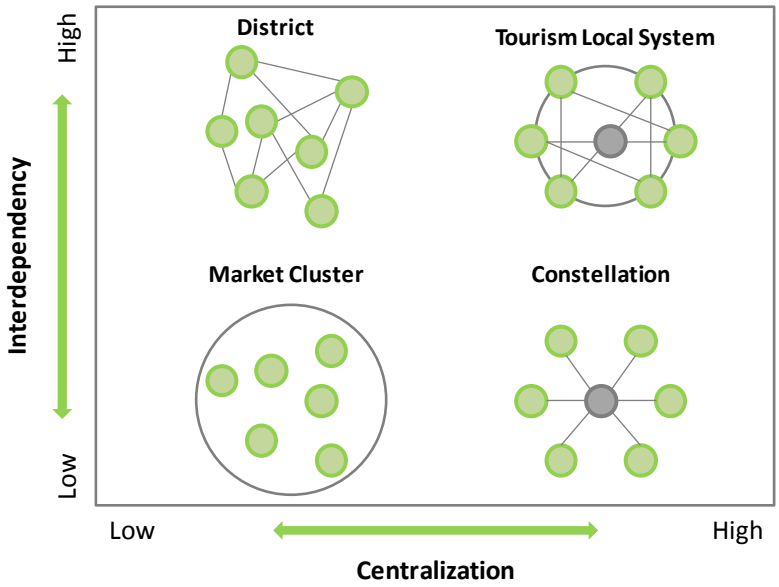
The variety of models of tourism systems also reflects the different configurations that they may present. This analysis can be made depending on two factors: the degree of *centralisation* of the system governance functions and on the degree of *interdependence* among actors[10] (Bonetti, Petrillo, & Simoni, 2006).

In the *district* type configuration, there is no unitary governance. Different players establish durable cooperation relationships and decision-making processes are jointly implemented in a set of co-evolution. *Market clusters* refer to a configuration where players belong to the same industry in the same location, but do not necessarily establish relationships of cooperation neither recognise a unitary governance body. *Constellation*-type systems are characterised by having a governance body with high power and acts as the centre of the network. Relationships with organisations are hierarchical, as the key player guides decision-making processes and determines development paths, to which other organisations have to adjust to. Tourism local systems

[10] Network properties and measures are object of a deeper analysis in section 4.2.5 and following.

comprise strong relationships among tourism actors and the presence of a governance body that guides local tourism development. This means that decisions are taken by a key organisation (Figure 4.8).

Figure 4.8 – Possible configurations of a tourism system



Source: Bonetti et al. (2006, p. 122)

Some specific issues may be highlighted regarding tourism systems, which should be kept in mind when considering them under analysis (Macbeth & Carson, 2005; Bonetti et al., 2006):

i. Tourism systems are **open systems**, meaning that tourism is not independent of other systems or events at local, regional, national or global level, neither organisations are independent of each other inside the system. Actions may be developed at local level, but do not occur in isolation. Firms and destinations are connected within the system and with other systems (e.g. located at generating regions, following Leiper's model);

ii. Systems are made of **complex relationships**, which occurs not only within tourism system, but also in the interaction with other systems (e.g. other regions, other industries or business sectors, other countries);

iii. **Strong links between tourist generating region and tourist destination region**. This means that regional tourism innovation and management agents should be interconnected with external agents, which may be an important source of knowledge for innovation, preventing lock in situations in regional tourism innovation;

iv. The **multitude of actors** makes necessary to understand the roles played by each agent and the relationships developed between them, that is, to assess the tourism network. This will provide important data for knowledge creation and diffusion, collective learning and innovation. It also allows to understand who are the entrepreneurs, the decision-makers, the planners, the investors, and the overall relations of interdependence;

v. The **core tourism system** of a region may be seen either **temporally**, as the roles and relationships occurring during a specific period of time, or **spatially**, bounded by geographical or administrative boundaries.

vi. Tourism systems' ability to generate innovation and competitive products is not a direct function of their configuration, but also of the consistency between the configuration and other factors related to the territorial area, such as entrepreneurial culture, business and personal relations among actors, levels of trust and cooperation, local resources, uniqueness, social capital, etc.

vii. In what more directly concerns innovation, the ties and interaction developed within the system will foster the creation of networked innovation processes which, if long-lasting, result in solid networks of innovation operationalising regional tourism innovation systems.

viii. The systemic approach to tourism innovation will also enable the identification of interaction with other industries or other systems that foster innovation and knowledge creation. These ties will as well prevent or counteract lock-in and decline situations by injecting new knowledge into the system that originates innovation.

Gallouj and Weinstein (1997) apply the concept of *recombinative innovation* to industry level, by arguing that clusters of innovation that emerge from different services and activities, such as tourism, are combined in an interactive way, resulting in innovation systems, as they merge knowledge, characteristics, goods and services, institutions, resources and so on.

4.2.3 Functions and activities of innovation systems

To analyse innovation systems it is necessary to move beyond the study of their components and the relationships among them. As mentioned before, all systems (regardless of their nature –

ecological, economic, innovation, etc.) have one or several functions that would not be performed by each actor individually, that is, if the system's components were not operating as a whole.

Innovation systems' functions or activities describe what effectively happens in the systems in result of the relationships established among the components. Most studies and theoretical approaches on innovation systems lean to emphasise the systems' structure, focusing on their components, rather than on the functions they perform (Rickne, 2000), which leads to a major weakness of IS research: "*the lack of system-level explanatory factors*" (Liu & White, 2001, p. 1092). Bearing this in mind, several authors propose different approaches to innovation systems functions. Despite this, there seems to be general agreement that innovation systems overall function is to "*pursue innovation processes, i.e. to* ***develop, diffuse and use innovations***" (Edquist, 2006, p. 190; emphasis added).

Regardless of the level of analysis, the development of systemic innovation always implies the creation and diffusion of knowledge. Therefore, **R&D and the creation of new knowledge** seems to be mentioned by most of authors that address this issue (Bergek, Jacobsson, Carlsson, Lindmark, & Rickne, 2008; Borrás, 2004; Chaminade & Edquist, 2005; Edquist, 2006; Johnson & Jacobsson, 2003; Liu & White, 2001). Galli and Teubal (1997) argue that R&D is a "hard function", as it is directly related to knowledge creation. David and Foray (1994) go further to include the re-use and recombination of knowledge, which highlights the importance of the utilisation of existing knowledge in different ways in order to innovate, rather than only the creation of new knowledge. Rickne (2000) puts it in a different way, by highlighting the creation of new technological opportunities and new products, which obviously would not occur without knowledge creation.

A second and somehow consensual function is strongly related to the former and refers to the **diffusion of the knowledge** created within innovation systems. The importance of knowledge dissemination is high enough for David and Foray (1994) to focus on the performance of innovation systems according to the distribution of knowledge, which should occur among universities, research institutions and firms, within a market, between suppliers and users and among decentralised R&D projects. This vision is shared by Bergek et al. (2008) and by Rickne (2000). For Borrás (2004), knowledge dissemination should also include its appropriation by the system's actors. The dissemination and appropriation dimensions will depend on the existent

linkages among actors (private and public) which will bring together complementary knowledge creating in an interface between knowledge suppliers and users (Galli & Teubal, 1997; Liu & White, 2001). The **diffusion of scientific culture** through science museums, science parks, and similar endeavours is equally important as a system's function (Galli & Teubal, 1997). This will allow a higher dissemination of innovations, may improve the interaction among actors, the sharing of an innovation culture present in the system, as well as it may act as an attractor for new entrants and entrepreneurship.

For an innovation system to develop and succeed there should be mechanisms that provide incentives or pressures for organisations to enter the system and also regarding the way they should conduct their innovative behaviour within it (Bergek et al., 2008). Borrás (2004) points to the existence of an institutional framework that encourages and supports innovators, such as SME incubators, promotion and support of entrepreneurship and a set-up for developing te management of innovation in firms. In this context, Johnson and Jacobsson (2003) defend that suppliers and customers of innovations need to be guided towards the direction of search, of resources deployment, technological and market choice and identification of problems, formation of standards or regulations and relationships to customers. In sum, innovation systems must assure the **guidance of innovators and search processes** that occur within them.

Another relevant issue is the **competence building through education and learning** (Chaminade & Edquist, 2005; Edquist, 2006; Liu & White, 2001). It is the existence of an adequate human capital (as the set of accumulated knowledge, experiences and personal attributes) that prompts collective learning and innovation. In this context, education is of major importance. Competence and human capital are fundamental resources that must be supplied by and within innovation systems (Johnson & Jacobsson, 2003) in specific fields, as well as in entrepreneurship, management, finance, and other important areas for the general functioning of systemic innovation (Bergek et al., 2008). Capacity building enhances firms' innovative capabilities (OECD, 2002a) and therefore contributes to the improvement of the systems' overall performance.

The **formation of markets** is also referred as an important function (Edquist, 2006), especially for emerging innovation systems or for those in a period of transformation (Bergek et al., 2008). This function includes legitimising innovations and removing obstacles that may be legislative or of other nature (Johnson & Jacobsson, 2003; Rickne, 2000). Legitimation implies the social

acceptance and compliance with new innovation systems or innovations developed within it. If so, it will facilitate the formation and access to markets (Bergek et al., 2008).

It is known that the structure of innovation systems evolves over time and over situations, namely in terms of the actors that compose them. The **creation and changing of organisations and institutions that participate in or influence innovations** is necessary for systems to develop, evolve and succeed over time, and systems should regard this as a function to be performed. Changing institutions may occur in what regards to tax laws, general laws, environment regulations, R&D investment routines, certifications, labour market regulations, etc. Organisations may be created to develop innovations, namely through enhancing entrepreneurship in the creation of new firms, new research institutes, policy agencies, innovation agencies, etc. (Bergek et al., 2008; Borrás, 2004; Edquist, 2006; Galli & Teubal, 1997; Rickne, 2000).

Innovation systems would not exist if **networking, collaboration and interactive learning** between different organisations would not take place. This function, that is of foremost importance, was found in every studies reviewed in this section (Edquist, 2006; Liu & White, 2001; OECD, 2002a, among others). While David and Foray (1994) focus on networking and collaboration regarding the distribution of knowledge, Borrás (2004) emphasises the 'alignment of actors' achieved through an institutional set-up based on formal clubs and networks of innovators, science parks and professional associations. Galli and Teubal's (1997) proposal of divulgation of scientific culture mentioned above also improves networking and collaboration. Johnson and Jacobsson (2003) and Bergek et al. (2008) relate this to the creation of (Marshallian) positive external economies, through the exchange of information, knowledge and visions. Knowledge transfer among organisations and interactive learning, which are definitely at the core of systemic innovation, would not occur if this function would not be performed. Furthermore, economic and social networks provide access to new resources that may prompt innovations (Rickne, 2000).

Finally, innovation systems should provide **services that support innovative firms** and entrepreneurs, such as incubators that provide access to facilities, equipment and administrative support, financing of innovation processes or activities that facilitate commercialisation and adoption of knowledge (Edquist, 2006; Rickne, 2000; Borrás, 2004; Johnson & Jacobsson, 2003)

and the provision of consultancy services relevant for innovation (Edquist, 2006) of scientific and technical nature (Galli & Teubal, 1997).

4.2.4 Boundaries: the importance of regions as the locus of tourism innovation

The importance of regions as the *developers* of competitive advantages and as the locus of innovation has already been discussed in this work, through various perspectives:

- The relevance of geographic proximity in fostering other types of proximities;
- The creation of trust among regional agents;
- The formation of networks and of social capital;
- The embeddedness of business relations.

The role and importance of regional agglomeration of firms in regions was discussed in section 3.4. It was also mentioned that, due to the effect of globalisation and the power of ICT some authors refute the relevance of close geographic proximity among economic actors, and consequently undervalue the importance of regions as economic entities where innovation occurs and is prompted due to the existent proximities. Expressions such as the “death of geography”, the “end of geography” (O'Brien, 1992) or “the death of distance” (Cairncross, 1997) are a reflexion of this point of view. Conversely, other scholars highlight the fact that globalisation, rather than diminishing the significance of regions and places, increases it significantly (Castells, 1996; Morgan, 2001, 2004; Porter, 1998b), as they play an extremely important role on nowadays competitive economic environment. The existent and reviewed models of territorial innovation, namely the regional innovation systems framework confirm the relevance and coherence of regions as privileged platforms for systemic innovation, as they counter the argument and practice of atomised business management models.

Regions endow specific and unique characteristics and skills that emerge from a symbiotic process resulting from the interaction among organisations and among these and the territories. If this relation is important for all economic business sectors, it increases when referring to tourism industry, where the physical space is the main performer and, together with local communities and businesses, creates the uniqueness of places, which should and must constitute one of the main innovation sources and the basis of the economic structure.

Economic globalisation reinforces local specialisation. Firms and regions all over the world tend towards local specialisation as a mean to improve its market position. In order to compete and succeed globally, firms must strengthen their position within regional networks. Market position of firms is strongly influenced by their inherited regional resources and institutions (Tracey & Clark, 2003).

The importance of regions grows (despite of or owing to globalisation) especially when dealing with SMEs, which would be at disadvantage in the innovation process with little or no access to global resources. Globalisation "*increases the necessity for all participants in innovation and the region as a whole of improved networking*" in order to avoid lock-in(Sternberg, 2000, p. 391).

Regions are focal points for knowledge creation and learning as they actually become learning regions, acting as collectors and repositories of knowledge and ideas and as structures that facilitate their flow (Molina-Morales & Martínez-Fernández, 2010). Information and knowledge are available globally, however, they always develop and are utilised locally (Sternberg, 2000).

Some regional strengths are based on immobile factors (such as regional tacit knowledge, the educational system, R&D, professional traditions and experiences, culture, trust, etc.) and generate innovation and uniqueness. This brings advantages for the region in global market competition (Hotz-Hart, 2000).

Lundvall and Borrás (1997) highlight that the regional dimension is crucial for innovation because the capacity for developing human capital and for interacting with other organisations (as well as social capital) is usually localised and innovation can emerge from ideas resulting from individuals or organisations sharing the same perspectives (political, cultural, economic) or engaged in the same economic space or region.

But how to define "region" when analysing regional innovation systems? The emergence of regions in different countries may result from two distinct processes: *regionalisation* and *regionalism*. The first refer to the delimitation of a supra-local territory by a superior political-administrative body (e.g. the state); it may or may not respect the pre-existing culture and history. It is a top-down process based on the definition of regional boundaries from above. Conversely, regionalism relates to a bottom-up process which involves political demands from

below, in a regional mobilisation in face of state neglect, inefficiency or discrimination, in order to achieve a new institutional ordering. This process creates new norms, routines and habits as it yields up a new governance structure. It is the expression of regional social capital (Cooke et al., 1997).

Cooke (2001, p. 953) provides an interesting definition of region, considering it as a "*meso-level political unit set between the national or federal and local levels of government that might have some cultural or historical homogeneity but which at least had some statutory powers to intervene and support economic development, particularly innovation*".

Often the administrative boundaries do not correspond to functional spaces. Therefore, within the regional innovation systems framework, regions should not be artificially created or defined based on a mechanical practice. They should emerge from geographical areas displaying a high degree of coherence or inward orientation with regard to innovation processes. Three possible ways for doing this is by identifying: (i) a sufficient level of localised learning spillovers among organisations (related to tacit knowledge transfer); (ii) patterns of localised mobility of workers as carriers of knowledge; and (iii) at least a minimal proportion of innovations should result from the collaboration among partners within the region (Edquist, 2006). This later perspective, strongly based on innovation networks, is broadened by Andersson and Karlsson (2004) who argue that regions, as functional entities, should comprise mechanisms that are crucial for systemic innovation, namely the high intension of economic interaction. The agents consist of nodes connected by economic and infrastructural networks. The borders of functional regions should then be determined by the frequency and intensity of economic interaction.

Despite being an ambiguous concept whose results will depend on the criteria to be used, there are four main ones normally used to define a region (Cooke & Memedovic, 2003; Cooke & Schienstock, 2000):

- **i.** It must not have a given size;
- **ii.** It should be homogeneous in terms of some specific criteria;
- **iii.** It ought to be distinguished from bordering areas by a particular kind of association of related features;
- **iv.** It should possess some kind of internal cohesion.

Therefore, to analyse a region, there must be specific criteria that define the territory as a functioning unit within a specific time.

Regions do not have fixed boundaries, as they can change in configuration, new ones can emerge and old ones perish. For instance, in Portugal, the former organisation of tourism regions comprised nineteen regions, each with its own Regional Tourism Board. These were smaller units (closer to the NUT III) than the actual configuration of five larger regions (corresponding to the NUT II). On one hand, the current larger regions may dissolve the specific characteristics of smaller destinations. On the other, within this new context, several smaller tourism poles emerged, by formal or informal association of municipalities and/or organisations. These highlight the destinations' singularities and develop their brands and tourism products based on their functionality, which results from the homogeneity of economic activity, history, cultural life, natural features, etc.

However, and considering the importance of governance structures and institutions for innovation, one must bear in mind that larger territories may contain more diversity, but this will not conduct to innovation if there is not enough proximity (Gregersen & Johnson, 1997), case in which smaller tourism regions would be more suitable. Despite this, as the size of administrative regions reduces, the influence of and dependence on "external" subjects tends to increase (Evangelista et al., 2002), demanding for strong and innovative regions able to compete globally for tourists, funding and resources.

In terms of empirical analysis of innovation systems, there is no agreement on which geographical unit is better suited. Some authors use cities or metropolitan regions, by considering that they converge several innovative factors; others use the local level such as smaller districts within cities or metropolitan areas; NUT II constitute a more aggregate level of analysis with the advantage of having available data, and the limitation that they might not correspond to homogeneous regions (Doloreux & Parto, 2005).

The appropriate delimitation of regions in terms of their dimension and border definition has been an issue in tourism destinations as well. Should Destination Management Organisations operate at a larger or smaller territorial scale? Should tourism products be developed in a bottom-up or top-down approach? In what more directly concerns the present work, is tourism

innovation systemic at regional/ sub-regional level, or is it fostered by central government or agencies? In order to find answers to these questions and to understand the most suitable level of analysis (and practice) of tourism innovation systems, one should start by defining what is a tourism destination.

In order to satisfy a wide variety of motivations and to accommodate visitors, a physical setting is required (Murphy, 1985). Usually, tourism destinations are formally defined by political jurisdictions, such as a country, a macro-region (several countries or groups that transcend national borders or reflect economic zones), a province or state, a localised region within a country, a city or town or a unique locale (historic site or national park) (Goeldner & Ritchie, 2002).

According to Georgulas (cit in Murphy, 1985, p. 7) "*Tourism as an industry occurs at 'destination areas' – areas with different natural and/or man-made features, which attract non-local visitors (or tourists) for a variety of activities*". This definition comprises two key aspects that distinguish tourism destinations: they should have attraction factors and appeal to non residents. Those attractions should appeal to at least one type of tourist, and they can be as varied as are tourist types. However, they are often divided in two categories: natural and man-made. The second dimension (attracting non residents) demands for people to travel some distance to a specific place in order to see the attractions or use the facilities (Murphy, 1985).

Laws (1995) also categorises tourist attractions into primary and secondary elements. The first relate to climate, ecology, cultural traditions, architecture and landscape. The later includes the facilities and developments specifically designed to be used by tourists, such as hotels, transportations, activities, animation and catering. This distinction draws attention to one of the main characteristics of tourism destinations: primary resources are used freely, without a direct financial contribution to their utilisation; however, tourism industry development in a specific destination depends on the availability of secondary resources as they are always commercialised. It is the tourism economic structure.

This raises another important question: how is tourism economic structure defined? That is, what types of economic activities are directly linked to tourism and are part of tourism destinations and industry? In what concerns innovation systems, this clarification is of crucial importance, as firms

are the active innovation agents, locally embedded and highly involved in tourism innovation networks. While in other industries (e.g.: ceramics, optics, manufacturing in general), it is obvious which firms belong to the system, tourism is made of services and results from the set of different economic activities. If these are the main innovation agents, they should be clearly defined in order to conceptualise a regional tourism innovation system.

Being this a very ambiguous issue, as several distinct definitions of tourism exist, either by the demand (Leiper, 1979; Mathieson & Wall, 1982; Murphy, 1985) or by the supply side (Smith, 1989; UNSD, EUROSTAT, OECD, & UNWTO, 2008), it was considered that Tourism Satellite Account's discourse is the one that is more proximate to the objective: of specifically defining tourism economic structure. Accordingly, tourism characteristic activities and products can be summarised in the following categories (UNSD et al., 2008):

Table 4.2 – Tourism economic structure (characteristic activities)

Tourism characteristic Products and Activities
Accommodation services for visitors
Food and beverage serving services
Passenger transport services (land, water, air)
Transport equipment rental services
Travel agencies, tour operators and tour guides
Cultural services (museums, entertainment, …)
Sports and recreational services

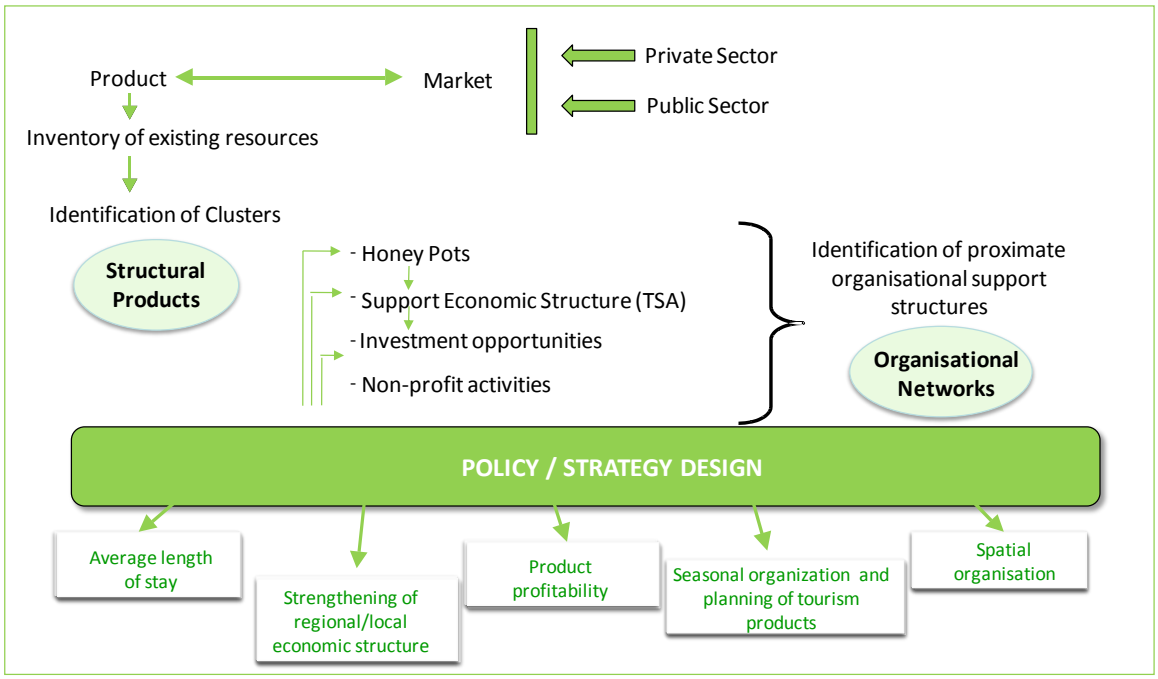
Source: adapted from UNSD et al. (2008, p. 30)

However, tourism destinations are not only geographic places lodging a set of businesses and firms. They are also social and cultural constructions whose meanings are defined or redefined by diverse people and agents and therefore subject to constant processes of change (Saarinen, 1998; Squire, 1998). These changes are observed in the interactions between tourism agents and/ or organisations, business transactions, tourism governance and institutional settings.

Buhalis (2000) argues that tourism destinations are amalgams of products and services constituting a global experience for tourists. Accordingly, they should be understood as perceptual concepts, subjectively interpreted by tourists depending on their travel itinerary, cultural experience, motivations, educational level and past experiences. Instead, tourism

destinations are often (and sometimes wrongly) identified in accordance to administrative divisions that derive from former land rights, geology or political history (Laws, 1995). Bonetti et al. (2006) argue that the unifying factor that defines a region as a competitive and autonomous territory is its economic and cultural homogeneity as perceived by clients (rather than political borders).

Figure 4.9 – The Product -Space Model



Source: Costa (2001, p. 80)

This perspective is well explored by Costa (2001) who argues that destinations are usually delimitated in a space-product perspective, in which tourism destinations are designed and commercialised according to administrative boundaries, and not in a more adequate logic of "product-space", which recognises that in order to design successful tourism products and services, there must be an initial deep and rigorous knowledge of the resources that will allow, subsequently, to identify clusters of tourism supply; that is, regional and local tourism products and destinations adequately structured and competitive in the global markets. The model presented in figure 4.9 is representative of this point of view.

The interest of this model goes, however, far beyond the valuable contribution to the geographic definition and governance of tourism products and destinations, as it incorporates elements that allow introducing some important issues regarding regional tourism innovation:

- First, it recognises the importance of private and public sector working together in this process. Innovative regional tourism products require the existence of fruitful relationships between private and public agents;
- It refers to "structural products" and "honey pots". These should be identified and developed within an innovative spirit that assures that they will become successful and profitable primary attractions;
- It incorporates tourism economic structure as a main element: in regional innovation systems, business and firms are considered to be the active innovators;
- Organisational networks incorporate proximate organisational structures. This highlights the importance of proximity (geographical, complemented with other types of proximities) and subsequently the relevance of regional tourism destinations at fostering geographic proximity among tourism agents, building trust and solid relationships materialised in innovation networks;
- Clusters (agglomerations of related businesses), supported in networks, seem to be the basis of this process. Tourism territorial innovation should also be developed within tourism networks, supported by an adequate institutional endowment;
- Tourism regions are able to preserve their regional identity, at the same time they create unique, innovative tourism products and destinations.

If regional tourism destinations adopt these practices, they will be able to: (i) foster an increased interaction among tourism related firms and organisations, as they see themselves in the others (homogeneity within networks); (ii) develop a culture of regional identity and, subsequently, of mutual trust (developed in networks and resulting from social capital); (iii) create innovative products based on the uniqueness of places ("honey pots"), whose structure will be much more valuable in global markets; and (iv) following the establishment of a tourism regional innovation system, tourism destinations will have the sufficient strength to increase their outwards connections, renewing their stock of knowledge and introducing incremental or radical innovations throughout the territory (spillovers).

Regional and local level gains, therefore, strategic importance in overall tourism management, and particularly in tourism innovation. As defended by the World Tourism Organisation (2005), these are the fundamental units of analysis of tourism, as they are the focal points in the development and delivery of tourism products and of implementation of tourism policy. In a study regarding the monitoring of tourism industry at regional level as a strategic management tool, regional tourism agents confirmed that the administrative boundary of tourism regions did not correspond, at the time, to the dynamics underlying tourism products and tourists flows that actually occurred in the territory (Brandão, 2007). Moreover, when analysing tourism development, namely destinations' evolution through stages as portrayed by Butler (1980) and proposed in Chapter II as the most suited model, it is suggested that this analysis is conducted at regional or local level. This should occur in order to fully understand the dynamic underlying the development of tourism destinations and the need for the constant creation of innovation.

In sum, for the purpose of this study, tourism destinations are regarded as geographical regions which are **homogeneous** in terms of characteristics, offered experiences, resources, image, perception and a tourism governance structure (with its goals, strategy and policy), representing thus a **unique territorial unit**. Boundaries are not relevant for this distinction, which does not mean that they cannot exist defining an administrative region that coincides with the perceived tourism destination.

4.2.5 Networks and relationships as the core of systemic innovation

Archibugi, Howells, and Michie (1999) consider that research on innovation networks is of paramount importance due to the fact that the absence of relationships does not allow the conception of innovation systems and that the relations established are crucial for the definition and analysis of the dynamics of innovation systems. It may be concluded thus, that networks support innovation systems and make them operational.

The origin and historical development of Social Network Analysis (SNA) is well documented by Freeman (2004) who comprehensively reviewed the main research done in this field. It is considered that it dates to the end of the nineteenth century with the precursor work of Auguste Comte (considered by many as the father of Sociology), who supported the importance of

quantitative methods and comparative research in sociology and explicitly stated how different parts of the social system are interconnected.

Emile Durkheim also contributed to the early foundations of SNA by distinguishing traditional societies (characterised by mechanic solidarity) from modern societies characterised by a division of labour that led individuals to cooperate based on an organic solidarity. Despite these early contributions, Georg Simmel was the first scholar to think in social network terms by offering a structural perspective on the association of individuals. To him, "*Society exists where a number of individuals enter into interaction (…); only when one individual has an effect, immediate or mediate upon another, is mere spatial aggregation or temporal succession transformed into society*" (Simmel, 1908/1971, cit in Freeman, 2004, p. 15). These ideas translate the core concept of modern social network analysis.

During the period between 1920's and 1940, the work developed by Jacob Levy Moreno boosted the findings on social networks research and contributed to its further developments. In result of his educational and professional background in psychiatry, he studied how psychological well-being relates and is shaped by the structural features of social configurations (the basis of large social aggregates such as economy, the state, etc). Within this context, he devised the sociogram as a graphic representation of the properties that characterise networks. These diagrams, similar to the ones used by spatial geometry, represent individuals by points and their social relationships by lines. Moreno's breakthrough allowed researchers to visualise the lines that tie people together and the channels through which information flows and by which individuals influence each other (Scott, 2000). He is therefore known as the father of sociometry.

The time period between 1940's up to 1960's is characterised by Freeman (2004) as the "Dark Ages", because social network analysis was somehow out of sight of the most influential academic circles. Despite this, it was kept alive by some academics working in different disciplines, such as geography, biology or anthropology. Research on social networks was fragmented and highly localised, which reduced its impact in academic studies and in the construction of a new paradigm for social sciences. Despite this, it is worth highlighting the seminal work of Cartwright and Harary from 1956. Working over the sociometry of Moreno, the authors analysed sociograms representing group behaviour by using mathematic formulas describing the properties of networks (Scott, 2000).

In the late 1960's and early 1970's, Harrison White began teaching at Harvard subjects related to social relations and social networks, which had a significant influence on students, some of which turned into important academics in this field. His research and publications consistently incorporated the complete social network paradigm thus contributing for the theory and practice of SNA (Freeman, 2004). For that reason, they still provide a highly influential model for social network analysts. White, as a sociologist, studied ways to collapse nodes that were equivalent in a network (with similar incoming and outgoing ties) in order to form a reduced network in which the nodes represented structural positions rather than individuals (Lorrain & White, 1971). This idea was well accepted within anthropologists, as they view social structures as networks of roles and not of individuals. An important and related contribution was the finding that structural equivalent individuals face similar social environments and thus are expected to develop similar responses and behaviours (Borgatti, Mehra, Brass, & Labianca, 2009). This time period, named by Freeman as the "Renaissance at Harvard" and personified by White represents, for many, the emergence of contemporary network analysis.

A landmark research in the field was conducted by Stanley Milgram in 1967. His "small world experiment" aimed to evaluate the average distance in social networks in USA, suggesting that human society is a small world network type characterised by short path lengths. That is, a person may come into contact with any other person in the world using a small number of connections/links. This work supported most of the concepts in which the "six degrees of separation"[11] theory is based (Freeman, 2004).

During the 1970's onward, social network analysis theory and research was finally an established field within social sciences, thanks to the advances in computing, which allowed the investigation of larger scale networks and the generalisation of related theory and methods. Furthermore, and under the influence of White, researchers such as Mark Granovetter (1973) who published a seminal paper on the "strength of weak ties" (analysed in detail further in this chapter) examining the role of weak social linkages between people; and Barry Wellman contributed significantly for social network analysis to became a generally accepted paradigm. The later had a special part in this achievement, as he founded the INSNA (International Network for Social Network Analysis) bringing together the fragmented research done by several scholars under different disciplines in

[11] "Six Degrees of Separation" theorises that everyone is, on average, approximately six steps away from any other person in the world.

a coherent and cohesive field of study (Freeman, 2004). SNA has now this professional organisation, an annual conference (SUNBELT), specialised software (e.g. UCINET, PAJEK), a specialised journal (Social Networks) and is generalised as a theory and method in several and diversified fields of study (Borgatti et al., 2009).

The development of quantitative methods for network analysis provided the grounds for an analytical definition of network, away from ambiguous understandings of the phenomenon and closer to the mathematical graph theory. According to Mitchell (1969, p. 2-3): "*In graph theory a finite set of points linked, or partly linked, by a set of lines (called arcs) is called a* net*, there being no restriction on the number of lines linking any pair of points or on the direction of those lines. A* relation *is a restricted sort of net in which there can only be one line linking one point to another in the same direction, i.e. there are no parallel arcs.*"

"*Networks constitute the new social morphology of our societies (…) they are the new structure of dominant functions and processes*" (Castells, 2010, p. 500-501). A network is a group of actors connected by a set of ties. The actors or nodes may represent different things, depending on the concrete network in analysis. They can be persons, teams, organisations, concepts, etc. (Borgatti & Foster, 2003). Ties connect pairs of actors and can be directed or undirected and can be dichotomous or valued. Different types of ties usually function differently. The topology defined by networks determines that the distance, intensity and frequency of contact between nodes is shorter (more frequent and intense) if they both belong to the same network, than if they do not (Castells, 2010). Within the network, actors are connected with each other in relationships of trust, obligation and mutual dependency upon exchanges as the actions of one actor will influence the others and the entire network (Burt, 1992).

Thus, social network analysis includes theories and models that provide tools to define and characterise the relations among nodes. Besides the relational content of these methods, the following principles should be added to the distinction of social network analysis (Wasserman & Faust, 1994, p. 4):

- Actors and their actions are considered as independent and autonomous units;
- Relational ties (linkages) between actors are channels for the transfer of resources (material or nonmaterial);

- Network models focusing on individuals consider the network structural environment as providing opportunities or restrictions for individual action;
- Network models conceptualise structure (social, economical, political) as long-term patterns of collaboration among actors.

The study of networks assumes therefore that individuals or organisations (nodes) do not act in isolation and their behaviour is strongly influenced by the pattern of relationships that they develop with other actors. Therefore, and despite the importance of the strength of individual ties between actors, the focus should be on the relations rather than on attributes, on structured patterns of interaction rather than on isolated and atomised individual actors, as it is the overall pattern of ties in a network that will determine its structure (Considine, Lewis, & Alexander, 2009; Scott, Baggio, & Cooper, 2008).

Networks are open structures, as they can unlimitedly expand, integrating new nodes as long as they are able to communicate within the network (Castells, 2010). However, new connections are usually made based on popularity (centrality), which attracts new ties. This way, actors with many connections make more connections than those with less links (Barabasi, 2002). This complies with the "small world" theory, as these networks will have a small number of individuals with a high connectivity rate and many individuals with reduced number of linkages.

In what concerns business and economic approaches, network analysis brings a new paradigm that represents an evolution of competencies-based theories, where relationships determine organisational performance (Scott, Baggio, et al., 2008).

The application of network theory and social network analysis methods to the study of tourism is recent. Nonetheless, several authors have been studying different dimensions of tourism dynamics under the light of network analysis, contributing, for instance, for regional tourism planning (1996) to the understanding of the role and dynamics of networks at local destinations and in local tourism businesses (Breda et al., 2005, 2006; Costa et al., 2008; Gibson, Lynch, & Morrison, 2005; Lazzeretti & Petrillo, 2006; Michael, 2007; Pavlovich, 2003; Petrillo & Swarbrooke, 2005; Presenza & Cipollina, 2010; Saxena, 2005; Saxena & Ilbery, 2008; Scott, Baggio, et al., 2008; Scott, Cooper, & Baggio, 2008; Swarbrooke, Smith, & Onderwater, 2004; Tinsley & Lynch, 2001), for tourism policy and governance (Baggio, Scott, & Cooper, 2010; Bramwell, 2006;

Dredge, 2006; Pavlovich, 2008), networks and tourism innovation (Dredge, 2005 ; Novelli et al., 2006; Paget et al., 2010; Sørensen, 2007), knowledge transfer (Baggio & Cooper, 2008, 2010) and learning (Halme, 2001) within networks.

Several definitions of networks exist, each highlighting different characteristics. Thorelli (1986) and Thompson, Frances, Levacic, and Mitchell (1991) stress that networks are forms of organisation that can be placed between markets and hierarchies, Lorenz (1991) focuses on the long-term dimension of mutual dependency relationships. Jarillo (1988, 1993) emphasises strategic networks' joint efforts towards common goals, defining networks as *"… a mode of organisation that can be used by managers and entrepreneurs to position their firms in a stronger competitive stance*". He goes further to consider "*strategic networks as long-term, purposeful arrangements among distinct but related for profit organisations that allow those firms in them to gain or sustain competitive advantage vis-a-vis their competitors outside the network*" (Jarillo, 1988, p. 32).

Based on these different approaches to the network concept, Costa (1996) developed a comprehensive definition which suits the organisational and economic approach:

> *(…) network can be defined as an organisational structure whose operating philosophy may be placed between Weber's bureaucratic model and the neoliberal or market philosophy. Networks are based on two or more (usually administrative independent) organisations which decide, by a formal or informal commitment, to engage in a medium- or long-term cooperation process involving the exchange of products and services (…). A network is, therefore, underpinned by the premises that every organisation depends on the success of others and also that competition must be viewed beyond the region where an organisation is located"* (Costa, 1996, p. 148).

Organisations engage in networks in order to obtain a set of benefits which, according to Child, Faulkner, and Tallman (2005, p. 147) are:

- The reduction of uncertainty of markets and transactions, because networking implies the creation of relationships based on trust and solidarity among the network members;
- To provide flexibility of production and resource allocation;
- To provide capacity, as the involvement in a network allows the expansion of firms endogenous capacities;
- To provide speed, by taking advantage of opportunities with immediate responses, due to the availability of resources, capacities and flexibility;

- To provide access to resources and skills exogenous to the organisation, but present in the network;
- To provide information, as network member have access to market intelligence. Usually, network members consider the fast, immediate and unrestricted access to information as the primary reason for being networked.

Networks enable actors to search for, obtain and share resources, engage in cooperative and collective actions in order to achieve common goals, exchange and diffuse ideas and mobilise resources (Saxena & Ilbery, 2008).

In Thorelli's perspective, power and trust are two necessary conditions for a network to be established, as these two factors dominate the relationships that develop within it (Thorelli, 1986). The author defines "power" as the potential to influence the decisions of other network members. The different levels of power and the linkages between actors will define the culture of the network. Power sources arise from: (i) the actors' economic base; (ii) the technologies used (related to innovative performance); (iii) the expertise; (iv) the level of trust; and (v) the legitimacy of the members and relationships.

This way, innovation will not only be the outcome of a network, but the individual innovative performance will contribute to the determination of the power of its members, which will, in turn, define the types of relationships and the overall innovative culture, that is, it may function as an input.

4.2.5.1 Types of networks

The categorisation of networks is not a pacific matter. In fact, several authors proposed different typologies, which results from the fact that networks are complex structures, their actors have distinct attributes and they are developed with different goals. What seems to be consensual is that networks are composed by nodes or actors, linked by ties that represent the relational content of the network. Therefore, the types of relations, the degrees of power and trust, the characteristics of the organisations and firms involved, the purpose of creation and the overall properties result in a stream of distinct classifications.

The classification based on the type of membership and the (in)formalisation of relationships results in the concepts of formal and informal networks, also understood as inter-organisational and personal or social networks (O'Donnel, Gilmore, Cummins, & Carson, 2001). *Formal arrangements* refer to formalised sets of actors and are defined and maintained at an organisational level. Relationships are established under specific and identified goals, which coordinate social interactions when they occur. They are characterised by commercial, rather than social types of relationships. *Semi-formal networks* may also develop when social relationships are perceived as having an importance equal to the formalised aims (Gibson et al., 2005). In this context, Grabher and Powell (2004) place *project networks* between inter-organisational and inter-personal relationships, defining them through their higher level of hierarchical coordination (when compared to informal networks) and their temporal limitation, as their objective is the accomplishment of a specific project or task. Despite the benefit that can derive from these arrangements due to the complementary skills of their members and the high levels of trust among them, the finite character hampers their development.

Informal networks develop mainly for social purposes, although their members exchange information with business and market value (Gibson et al., 2005). The actors engage in informal networks due to shared experience, existing social ties or familiarity bonds, which grants them repeated relations during long periods of time. Informal networks afford several benefits, especially when they develop in organisational contexts or within formal arrangements, as they can compensate the weaknesses of hierarchical forms of organisation and create means for collective learning and sharing of experiences and know-how (Grabher & Powell, 2004).

Chetty and Agndal (2008) go further in analysing the degree of formalisation at organisational and individual level, resulting in four different types of networks. The authors argue that each network type plays different roles and has distinct impacts in the territorial agglomeration in which it is embedded (Table 4.3).

The co-existence and mutual relations between organisational and personal networks can bring important benefits for the firms and businesses involved. While some consider interpersonal networks as a sub-set of organisational networks, others consider that they provide support, infrastructure and preconditions for the development of inter-organisational activities (Chetty & Agndal, 2008).

Table 4.3 – Interconnectedness of formal and informal inter-organisational and interpersonal networks

		Degree of formalization of relations between actors	
		Formal	**Informal**
Actor Level	**Organisation**	Network of organisations, which is (are) limited in size and scope. Members who jointly create the network grant access to new members. It is thus planned in nature	Network of organisational relationships, which are transactional and non-transactional in nature, emerging as a result of interaction between firms. It is difficult to identify network boundaries, both regarding the spatial and temporal dimension. Any firm may become a member of the network through exchange with other members.
	Individual	Network of individuals, which is limited in size and scope. The network is created with an identifiable starting point. It may serve business or other purposes (e.g. sports clubs, alumni associations).	Network of individuals formed through social interaction. Its boundaries are difficult to identify, since secondary, tertiary, etc contacts are also part of the network. Any individual may become a member through social interaction. It may serve business or other purposes.

Source: Chetty and Agndal (2008, p. 3)

A different distinction made by some authors is between *hard* and *soft* networks (Ffowes-Williams, 1996; Saxena & Ilbery, 2008). Hard networks are characterised by being economic and profit-related, that is, they focus on the direct generation of profits. Therefore, they almost always require formal agreements regarding the sharing of profits or resources. Usually, this type of network comprises a reduced number of firms and is based on geographical proximity, which creates the conditions for a high frequency of contact. Soft networks have an open membership, including several types of members such as firms, organisations, community groups and individuals, who address broad and generic issues regarding the industry or business sector. Firms' commitment is lower. Despite it, these networks are very cooperative and value social norms and reciprocity.

Malecki's (2002) approach to hard and soft networks is framed in the discussion of the competitiveness of places. His interesting point of view distinguishes hard and soft networks under the light of modern technological developments and the findings of economic geography. Soft networks sustain public and private organisations and must operate not only at local/ regional scales, but globally as well, in order to collect knowledge through social interaction. He stresses that networks that only embedded locally and do not create and maintain linkages in

global markets, jeopardize the levels of innovation and competitiveness. When agglomerations and networks are over embedded and ties are closed, this will eventually lead to decline, as the region or industry will become insular and closed to new ideas, suffering from lock-in effect. It is the "weakness of strong ties" (Chetty & Agndal, 2008; Grabher, 1993; Uzzi, 1996). Conversely, under-embedded firms will not have access to the knowledge and capability enhancement that the membership of a network can bring. Moderate embeddedness provides enough freedom and flexibility to avoid lock in, and crucial access to wider knowledge (Child et al., 2005)[12].

Hard networks rely on technological capabilities, considered as a highly competitive factor for every network member. This capability demands for hard networks such as the Internet and ICTs that provide means (other than geographic proximity) for information exchange. This distinction relates to the concept of *virtual geography*, referring to multidimensional geography which incorporates "*physical space, cyberspace and technologies that link them*" (Malecki, 2002, p. 935).

It is possible, under this approach, to relate soft networks with the transfer of tacit knowledge as a current practice, facilitated by geographic proximity and by (mostly informal) social relations. Conversely, hard networks are proximate to the "*death of distance*" theory (section 4.2.4), acknowledged by authors supporting ICTs as replacers of geographic proximity in knowledge exchange and creation. Nonetheless, tacit knowledge dimension is left aside, as the only transferable knowledge within these type of networks is codified. Despite this, hard networks are privileged potential incubators of soft networks.

The spatial dimension is also considered when distinguishing between open and closed networks. *Open networks*' linkages are spatially sparse and characterised by dynamic interactions between multiple actors with power differentials. Links are mostly weak and non-redundant. *Closed networks* are more restrict, as they are comprise mainly social relations set on personal, strong ties between family and friends and on a sense of belonging to a specific place. Within this scenario, the exchange of tacit knowledge and collective values is a current practice that brings important benefits for network members (Saxena & Ilbery, 2008).

A final remark to include the classification of Szarka. Despite the fact that there are several other network taxonomies, this author's work is of special importance, as it refers to small firms'

[12] See section 3.4.1 for a deeper review on the different types of proximities.

networking patterns (as widely acknowledged, tourism is mainly composed by SMEs). These may be set on *exchange*, *communication* or *social relations* (Szarka, 1990, p. 11-12), and are characterised as follows:

- *Exchange networks*: firms and organisations with commercial transactions. They are sustained by communication and social networks;
- *Communication networks*: group of organisations and individuals with non-trading links that inform their business activities. Relations have the character of official and semi-official information flows.
- *Social Networks*: linkages between family, friends and acquaintances; social networks apply to two settings: personal network of contacts with specific individuals and the wider cultural dimension in which actors operate.

Grabher and Powell (2004) distinguish between four different types of networks, based on temporal stability and governance. Informal networks result from shared experience, existent social ties, or bonds of familiarity and are therefore involve long-term horizons. Project networks, which are short term arrangements to accomplish specific tasks, involve both organisational and personal relationships. Business networks rely on purposive, strategic alliances. Regional networks derive from geographic propinquity, embracing a variety of personal relations such as neighbourhoods, social clubs, political parties, kinships, etc. These multiple and sometimes overlapping affiliations produce assets that are region-specific: skills, trust and reliability.

In addition, Knoke (2001) provides a useful review on the characteristics of networks, considering firms size and typology. He analyses industry alliance networks, large firm-small supplier networks, small firm networks, regional alliance networks and organisational field alliance networks.

4.2.5.2 Network structure: fundamental concepts and streams of research

The social network approach to organisations involves several concepts and areas of study that guide the research towards specific aspects of organisational networking. Within these, theories that characterise the nature, quality and type of ties between actors and the networks'

morphology appear to be prominent research areas, with significant developments in the recent years.

Social capital is probably the largest growth area of research in organisational network studies (Borgatti & Foster, 2003). It addresses the advantages and benefits that individuals get from the relationships established within a network (Lin, 2001). Coleman was responsible for the popularisation of the concept in economic behaviour. He defined social capital through its function as *"a variety of entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain action of actors - whether persons or corporate actors - within the structure"* (Coleman, 1988, p. 98; 1990, p. 302). He further recognises that social capital is an element that derives from an informal social organisation and that it constitutes a productive resource for one or more actors (Coleman, 1994). Hamdouch (2007) and Coleman (1988), among others, provide important insights for the conceptualisation of social capital, by considering it is:

- *Productive*, as it makes possible the achievement of certain objectives which would not be possible if it would not exist;
- *Specific* to certain activities, because a given form of social capital may benefit certain actions and at the same time be useless or even harmful to others (e.g. it may favour work relations, but harm personal relations such as friendship);
- *Inherent* in the structure of relations among actors (corporate actors included), and not lodged in the actor himself.
- Built on the *high connectivity and cohesion of the network,* which facilitates trust and the exchange of information and knowledge and contributes to collective learning.

Similarly, Putnam refers to social capital as the "*social networks and the norms of reciprocity and trustworthiness that arise from them"* (2000, p. 19). The author presents a broader view of social capital, based on a more collective approach. He argues that social capital is the potential cause of good governance and economic development and results from path-dependent historical legacy. These ideas are present in the following statement: "*Working together is easier in a community blessed with a substantial stock of social capital*" (Putnam, 1993, p. 35-36).

Different levels of success of firms can result from the intensity of their linkages with other actors, because these linkages enable the transfer of tacit knowledge and increase collective learning.

The existence of social capital depends on the ability of people to connect with each other and the extent to which their shared norms and values allow them to subordinate their interests to the overall interests of the community. Individuals must also have the opportunity, motivation and ability to share their tacit knowledge, as they must have something to share that is valuable for the network (Asheim et al., 2003; Chaminade & Roberts, 2002).

However, social capital manifests in different forms. There are different types of social relations that constitute valuable resources to individuals. Coleman distinguishes between three forms of social capital: (i) *obligations, expectations and trustworthiness:* within a network, when one does something for another individual, he expects something in return – reciprocity. This depends on two elements: trustworthiness of the social environment and the extent of obligations held, which will vary with different social structures; (ii) *information channels*: social relations provide valuable information that constitutes the basis for action; and (iii) *norms and sanctions*, especially the norm that leads individuals to neglect their own interests and act in the interests of the network. Norms are reinforced by social support, status, honour and other rewards (Coleman, 1988).

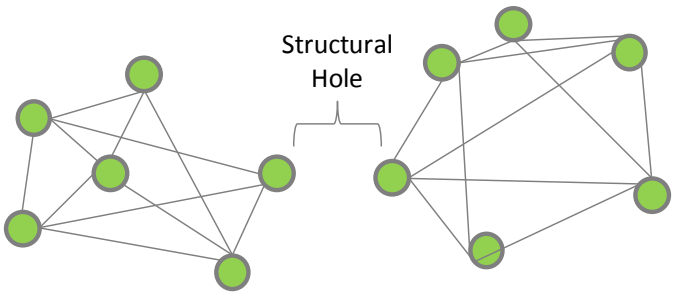
In sum, individuals engage in networks and relationships in order to get something in return. This occurs due to the fact that social structures, as referred, are privileged platforms for the flow and repository of information; because social ties influence decision makers; they may work as "social credentials" by reflecting an individual's access to resources; and may reinforce identity and recognition (Lin, 2001).

Coleman's approach to social capital draws on the concept of *network closure*, which is the degree to which everyone knows everyone else in a network. Tthe social structure develops and works within a limited and closed loop. Within this perspective, social capital emerges from a strongly interconnected and cohesive network of actors, which facilitates trust, exchange of knowledge and collective learning. Close-knit networks have a higher ability to transfer tacit knowledge, when compared to sparse structures (Coleman, 1988, 1990; Powell & Grodal, 2006).

While the previous definitions mainly address how social capital can be used to the improvement of the entire network, Burt is more concerned with how individuals can use social capital to obtain better competitive positions within the social structure. Kilduff and Tsai (2003) refer that

one of the most fascinating streams of research within social networks is that of how the absence of ties between nodes defines the network structure and the opportunity to build social capital. This leads us to the analysis of a fundamental concept within social networks: ***structural holes*** (Burt, 1992).

Figure 4.10 – Example of a Structural Hole



Source: own elaboration

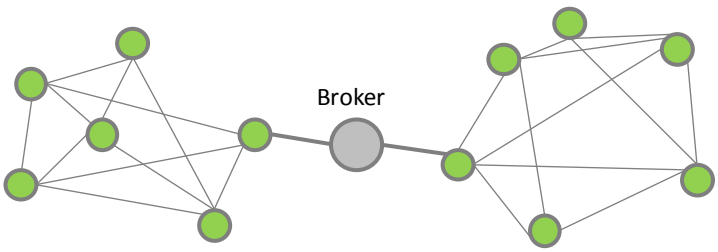
Structural holes refer to the gaps in a social structure, to the absence of social ties between nodes in a network. These nodes can be connected by a broker, who will gain control over the flow of information (or other resources) across the gaps. Brokers highly increase their social capital by linking two otherwise disconnected nodes (directly or indirectly), cliques or even entire networks. In this context, social capital is created within a network by structural holes, as people can broker connections between formerly disconnected nodes, thus having privileged access to information and control over the projects that bring together actors from different sides of the hole. These individuals can leverage their investment in social relations by connecting with different groups, achieving a powerful and competitive position (Burt, 1992, 2001). Conversely to Coleman's understanding on the most fruitful network structure for the creation of social capital (network closure), Burt considers that it is rather a function of brokerage opportunities that emerge from structural holes.

> *Structural hole [is]… the separation between nonredundant contacts. (…) is the relationship of nonredundancy between two contacts. (…) As a result of the hole between them, the two contacts provide network benefits that are in some degree additive rather than overlapping* (Burt, 1992, p. 18).

Networks expand mainly through strong ties, especially due to the process of homophily, the creation of ties among actors that are similar to each other in some specific way, such as demography, affiliation, interests, business, location, etc. The greater the similarity between nodes in a dyad, the stronger is the tie, which applies to other homophilous actors, e.g. friends of friends (Koput, 2010).

Structural holes refer, as mentioned, to the separation between nonredundant (disconnected) contacts/ actors. The existence of strong ties will produce two types of redundancy: by cohesion and by structural equivalence. These two conditions, when empirically verified, indicate us the presence or absence of a structural hole. Redundancy by cohesion occurs when a specific node is tied to other nodes that are themselves connected to each other. Consequently, information that can be obtained from one of them can as well be obtained from any other. Redundant ties originated by structural equivalence takes place when two nodes have the same ties with the same set of other nodes, being each of them an intermediary to the same others (Burt, 1992). Despite the type of redundancy, when it occurs it means that a high number of ties are being maintained in order to get the information that would come from any of them. A single tie to a member of a redundant set will provide the access to the information possessed by the entire structure. All additional ties represent a loss of time and energy and will not bring any new information. The cost of this type of structure is high, as maintaining strong ties blocks the access to nonredundant actors that could provide the actor with new information, stimulating innovation.

Figure 4.11 – Example of a Broker



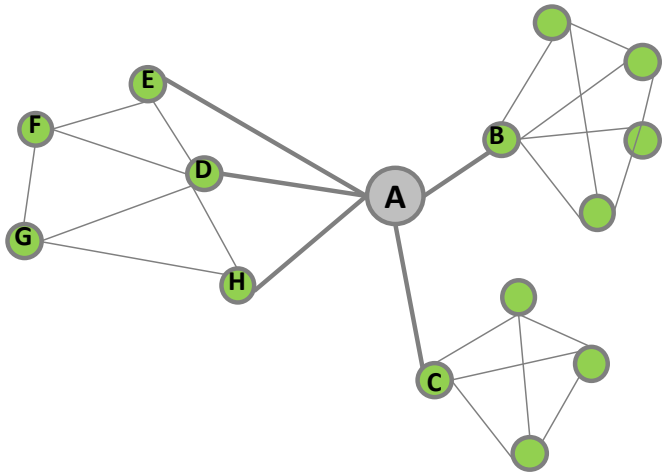
Source: own elaboration

Brokers bridge structural holes, recognised by the lack of cohesion or of equivalence among actors. Brokers achieve a unique combination of information fostering innovative potential difficult to imitate because it emerges from social ties rather than from training or position.

This theory embraces two categories of benefits that individuals fulfilling structural holes can achieve: information and control benefits. These can be understood through the notion of *tertius gaude*ns, meaning "*the third who benefits"*, referring to an individual who profits from the disunion of others. In this case, the broker obtains greater access to information, improved timing of response to opportunities because he accesses novel information earlier and gains control over and negotiates the social relations by being located between two players who seek for the same information or between two players in two or more relations with conflicting demands (Burt, 1992, p. 30-31).

In Burt's perspective, the more structurally constrained actors (those having small, dense and closed networks with few or indirect ties) are less likely to attract new partners, as they offer lower returns, have reduced access to new information and are engaged in a routine behaviour that does not favour innovation. Large, diversified, sparse and open networks stimulate creativity and innovation as they provide the access to varied information and do not constrain members, thus fostering innovative practices. As exemplified in figure 4.12, node A's bridging role in the social structure provides it with structural advantage towards node D, despite it is located in the centre of a tightly-knit clique.

Figure 4.12 – Example of a node's structural advantage within a network



Source: own elaboration

Following these ideas, Burt argues that the spanning of structural holes provides the mechanism that relates weak ties to positive outcomes in Granovetter's ***Strength of Weak Ties*** (SWT) theory (Granovetter, 1973).

The strength of a tie is a function of the "*amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterise the tie*" (Granovetter, 1973, p. 1361). Multiplexity, which means that a given dyad has multiple types of ties (advice, friendship, family) also indicates the presence of strong tie, as it facilitates network closure and cohesiveness (Koput, 2010).

The argument of the strength of weak ties claims that someone's acquaintances (weak ties) are less likely to be socially connected with one another than his close friends (strong ties). The actor's set of acquaintances comprise a low-density network (where many of the possible ties are absent – presence of structural holes) because it is unlikely that they know each other; conversely, the same actor's network of close friends is densely connected (most of the possible ties exist). Weak ties between a node and his acquaintances are crucial bridges between two dense cliques of close friends that would otherwise be disconnected. Granovetter's theory asserts that individuals with few weak ties will be deprived of information from distant parts of the social system and are thus confined to marginal information from their close friends (strong ties) (Granovetter, 1973). This has obvious and significant impacts on innovation, as it diverts those nodes away from new knowledge and hampers the process of collective learning. Without weak ties new ideas will not spread beyond the clique. Similarly, the lack of weak ties will prevent new ideas and new information from other groups to enter the clique. Consequently, this type of network structure is characterised by being "*fragmented and incoherent*" and by the slowness in the spread of information and scientific findings (Granovetter, 1983, p. 202).

The geographic location is important to this discussion. Considering that different locations originate cultural differences, the ideas created and shared by a specific group will probably be entirely new for a network located elsewhere (Granovetter, 1983). Bearing this in mind, weak ties between networks from different regions or countries perform an important mediating role by providing the necessary channels to knowledge, information and innovation diffusion, preventing this way the lock-in effect. When passing though weak ties anything that is to be transmitted, reaches a larger number of actors and crosses a higher social distance[13]. Accordingly, individuals with many weak ties are in a better position to diffuse innovations (Granovetter, 1973).

[13] *Social distance* may be defined as the number of lines in the shortest path from one node to another in a network (Harary et al, 1965, cit in Granovetter, 1973).

As stated by the author, the most important source of weak ties is perhaps the division of labour, because specialisation and interdependence between firms results in a variety of specialised role relationships. This is present in industrial districts, characterised by an agglomeration of small specialised firms working in the same business sector, located in a territory where people know each other due to work relations based on trust and reciprocity and where an "industrial atmosphere" exists.

DiMaggio and Powell's analysis of institutional isomorphism seems to contribute to the discussion of weak vs. strong ties and their effects on network members. The authors address the homogeneity between firms in the same organisational field, concluding that the observed similarities result from isomorphism, a "*constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions*", searching for compatibility with other organisations of the same geographic location and/or organisational field. While firms engage in this process in order to face: (i) dependency on a source of resources; (ii) lack of alternative organisational models; (iii) uncertainty or ambiguous goals; and (iv) professionalisation and structuration of the field, at some point, the aggregate effect of individual change is to lessen the extent of diversity within the network (DiMaggio & Powell, 1983, p. 149). This occurrence will have similar results to those of a dense network made exclusively of strong ties, as it will not foster innovative practices in organisations structure and operation, hampering their engagement in new social relations.

A final concept that allows understanding how networks' structure models and influences the actors' behaviour, is the ***embeddedness*** of economic behaviour in social relations, that is, economic behaviour and exchanges are influenced and constrained by the existent network of social relations, being thus a social phenomenon. These personal relations and networks generate trust and discourage malfeasance. Business relations embedded in social relationships develop within a logic distinct from the one verified in purely arms-length market relations (Granovetter, 1985). Uzzi's empirical work on this subject pointed out that embeddedness as an exchange system creates unique opportunities and access to those opportunities due to the structure and quality of the social ties. Embedded firms have higher survival chances than firms maintaining market relationships. However, too high or exclusive embedded relationships can hamper economic performance by locking firms in the network, alienating them from new information and opportunities located outside it (Uzzi, 1996). To this regard, Simmie (2005) stresses the role

of space by arguing that trust is one of the most relevant social relations and that it is build through repeated face-to-face personal contacts, which are easier when there is geographic proximity. Moreover, social interactions that are confined to a region follow the same conventions and norms, while actors share the same culture and habits. In sum, economic behaviour is embedded in social relationships, and these are by their turn embedded in a regional context.

4.2.5.3 Networks properties and measures

As previously mentioned, different network structures will provide different competitive advantages, economic behaviour, social capital, knowledge and information transfer and, subsequently, different innovation patterns. Coleman's *social capital* theory provided some insights on the benefits of strong ties and dense networks. On the other hand, *structural holes* and the *strength of weak ties* theories highlighted the competitive advantages that a single actor or a whole network can draw from the presence of intermediaries (brokers) bridging otherwise disconnected actors or networks, resulting from the existence of weak ties.

Network properties help to define the network structure and provide the necessary measures to characterise the relationships that develop within it. The network structure *"(…) is a configuration of relations in an institutional environment. It is both the basis and the result of processes of interaction. (…) It enables and constrains action, and action (re)constructs structure*" (Nooteboom, 2004, p. 70). Knoke and Kuklinski (1982) noted that the structure of the network and the relations among actors have significant behavioural, perceptual and attitudinal consequences for individual units and for the entire system.

Therefore, in order to understand these consequences, a number of important properties and related measures need to be considered when analysing networks. In this section, it is intended to present and explore some of the properties most referred in the literature and how they can contribute to the understanding of innovation networks. The specificities and interpretation of network measures are further analysed in chapter 5, section 5.3.4.2. Some authors divide network properties in *relational,* when they inform about the ties and relationships developed

among actors, and *positional*, such as those who enlighten about which actors occupy which positions in a network (Haythornthwaite, 1996).

The network size (number of network participants) and the type and strength of ties might be a place to start. The type and strength of ties may be defined through the analysis of their "*(i) scope; (ii) investments in the tie (size, specificity and economic life); (iii) frequency of interaction; (iv) duration; (v) openness of communication; (vi) cognitive proximity; and (vii) spatial proximity"* (Nooteboom, 2004, p. 68).

Centrality, **prestige** or **prominence** relate to which actors are important in a network and which are not, and include central measures and analysis of network structure. Central positions in networks are strongly connected to social capital, because a central actor has higher access and control over information and resources, as it entails a large number of connections with other nodes. An actor will thus occupy a strategic position if it can reach other actors on short paths. Central or prominent actors are those engaged in many ties/ relationships with others, regardless of being the recipient or the source of the relationship (nondirectional ties), and are the most active in the network. Central actors can maintain, create or prevent the creation of information channels. Centrality has implications for power, not only due to the access and control of information, but also in what relates to the access to alternative actors in the network, reducing the dependence over one or few network nodes (Degenne & Forse, 1999; Hanneman & Riddle, 2005; Haythornthwaite, 1996 ; Kolaczyk, 2009; Koput, 2010; Nooteboom, 2004; Scott, 2000; Wasserman & Faust, 1994).

Centrality is measured by the *degree*, *closeness* and *betweenness*, which inform about the actors' location in the network, and *network centralisation/ group degree*, which combines individual measures to obtain a group level analysis (Wasserman & Faust, 1994). In order to perform a solid analysis on actor and network centrality, the outputs of these measures should be interpreted together. For instance, an actor may have a low degree centrality, but a high betweenness, which grants him a privileged strategic position as a broker or intermediary having high access to new knowledge and performing an important role in innovation diffusion.

Networks can also be evaluated in terms of their levels of **connectivity or cohesion**, which relates to the extent to which subsets of actors are cohesive. A network is connected if there is a path

between each pair of nodes, meaning that all pairs of nodes are reachable. Network cohesion can be analysed by using measures such as *density*, *reachability* or *geodesic distance*. Different levels of connectivity have distinct impacts on how information, knowledge and innovation flow easily within the network and reach all actors (Wasserman & Faust, 1994). For instance, lower distance and reachability will facilitate the diffusion of innovations and information, increase levels of trust, homogeneity and the strength of the relation (higher proximity and lower number of paths between two actors represent a stronger relation).

Density refers to the number of direct ties between participants in relation to the maximum possible number of ties (making it a useful alternative to degree centrality which, being an absolute measure makes comparison between different networks impossible). Dense and sparse network structures reflect some of the presented theories, namely Coleman's network closure, Burt's structural holes and Granovetter's strength of weak ties. These structures present different contributions to innovation, in the form of benefits or disadvantages.

Network cohesion can also be studied in terms of cohesive subgroups (clusters), or the degree to which actors are connected to each other by cohesive bonds. The identification of subgroups allows examining if they bring cohesion to the overall network or result in fragmentation. Networks with many subgroups with overlapping membership provide strong social capital (Koput, 2010) and innovative potential.

Within this context, it is useful to approach the concept of structural cohesion: "*A group's structural cohesion is equal to the minimum number of actors who, if removed from the group, would disconnect the group*" (Moody & White, 2003, p. 109). It is the social relations of its members that holds a group together, which means that if dyads are linked to each other though multiple others, the structure is less vulnerable to fragmentation. Cohesive subgroup analysis can be applied to individual actors (permitting an individual positional analysis), subsets of actors or to the whole network (Knoke & Kuklinski, 1982; Moody & White, 2003; Wasserman & Faust, 1994). Clusters can be analysed as components (maximally connected sub-graph; minimum setting for a cohesive substructure), cliques (based on complete mutuality), n-cliques (based on reachability) or n-clans (based on distance) (Hanneman & Riddle, 2005; Knoke & Kuklinski, 1982; Kolaczyk, 2009; Koput, 2010; Scott, Baggio, et al., 2008).

Social roles and positions are also important analysis to be undertaken when analysing innovation networks, as they are usually strategic for networked innovation development and diffusion. Structural holes and brokerage positions were already approached in this chapter, mainly due to their extreme importance for social capital and innovation. Another important concept is the one of structural equivalence. Two actors are structurally equivalent when they present identical ties to and from all other actors in the network, although not necessarily connected to each other (Wasserman & Faust, 1994). Thus, they fill the same role with respect to members of the same network or a similar role relative to similar others. They are in identical positions, therefore, opportunities and constraints operating on one actor are also present for other (Hanneman & Riddle, 2005), such as access to information and knowledge, opportunity for learning and for innovating. This may lead to the identification of entrepreneurs, leading innovators or individuals who shape the network innovative atmosphere. Once this rigid concept of perfectly equivalent actors is hard to find in real world, it was weakened in order to find actors that are sufficiently similar to be regarded as equivalent. In this sense, the concepts of automorphic and regular equivalence emerged, presenting actors with similar configuration of ties (Scott, 2000; Wasserman & Faust, 1994).

4.2.5.4 Networks prompting tourism innovation

As previously mentioned, regional innovation systems are made of components (organisations and institutions) and of the relationships (networks) established among them. In the last decades, networks of innovators and, moreover, the diversity of actors and relationships involved in the innovation process have suffered a considerable increase (Mowery, 1999; Powell, 1990). *"(…) more and more of the innovation process takes place through networking rather than through hierarchies and markets. (…) only a small minority of firms and organisations innovate alone, and that most innovations involve a multitude of organisations"* (Lundvall & Borrás, 1997, p. 106).

In tourism, the situation is not different. Sundbo et al. (2007, p. 90) argue that "*innovation in tourism requires networks and co-operative systems*" and that territories assume a paramount role, as this should be viewed "*from the destination perspective, where tourists come to a destination and the tourist firms are mutually dependent on developing common destination innovations*".

Regional innovation networks are seen as important mechanisms of growth for both individual businesses and for regions as a whole. This idea was developed by GREMI with the innovative millieux model, and followed by other scholars working on innovation networks and regional development. Innovation networks and innovation systems can be clearly differentiated: while the former is an explicit form of cooperation and exchange in order to create knowledge and to develop products and services, the later involves the wider regional institutional capacity that creates the potential for innovation networks to develop and succeed.

The social world is constructed as a network of communications. In what regards to innovation, ideas exist and come to life within and in result of such networks, which includes connections between firms, governments and civic agencies, interest groups and social movements, etc (Considine et al., 2009). "*Networks provide access to more diverse sources of information and capabilities than are available to firms lacking such ties, and, in turn, these linkages increase the level of innovation inside firms*" (Powell & Grodal, 2006, p. 68).

Network relationships can create and provide firms with unique and non-replaceable value as well as access to incomparable resources and capabilities of other organisations, giving them crucial conditions to innovate. Networks grant timely access to external knowledge and resources otherwise unavailable to a single firm and at the same time they allow the testing of internal expertise and learning abilities (Costa et al., 2008; Powell, Koput, & Smith-Doerr, 1996; Vonortas, 2009). For instance, Acs and Audretsch (1988) highlight that knowledge spillovers resulting from regional networks compensate the lack of R&D by SMEs that frequently do not have the financial or institutional means to engage in such endeavours. They therefore engage in collaborative research activities with universities, research centres or spin-offs. This situation is particular relevant for services, in general, and tourism in particular, as it is mainly composed of SMEs. In addition to the creation and transfer of knowledge related to innovation, networks allow firms to learn to innovate synergistically and to develop routines to that effect, such as technology transfer and to locate themselves in strategic network positions (Powell et al., 1996). However, for Camagni (1991), while regional innovation networks improve the access of small businesses to experience and knowledge, their true strength is in their ability to provide ties to global networks.

However, a network will only be successful if the key elements of networking are present. According to Cooke (1996), network relationships and operations must assure *reciprocity*, *trust*, *learning*, *partnership* and *decentralism*.

Benefits deriving from networked innovation were addressed when the territorial innovation models and agglomeration externalities that derive from different proximities developed among organisations were reviewed. It also clear, at this point, that different network structures will have distinct impacts on innovation processes and outcomes, both for the entire network and for individual actors, according to the positions they occupy.

The broader the networks an organisation is affiliated in, the more experiences, competencies and opportunities are derived by it, which will increase innovation performance. The access to more varied activities, experiences and people will prompt the enlargement of the pool of available resources as well as the knowledge base. Multiplex ties (diverse types of relationships) deepen relationships, commitment and knowledge sharing (Powell & Grodal, 2006).

Within this context and according to Hotz-Hart (2000, p. 434), the benefits of networks for the development of innovation rely on:

i. *Better access to information, knowledge, skills and experience*. Networks provide opportunities for learning about new operation methods and new technologies, therefore enabling the reduction of production time and the cost of new products and processes;

ii. *Improved linkages and cooperation between network members*. Effective networks encourage interactive learning, synergies and complementarities between members.

iii. *Improved response capacity*. Firms respond faster to challenges and anticipate changing competitive circumstances.

iv. *Reduced risk, moral hazards, information and transaction costs.* Networks allow the sharing of resources and consequently the reduction of costs. Risks can also be shared and jointly assessed, leading to more informed decisions.

v. *Improved trust and social cohesion.* Values, goals, norms and ways of working are shared, facilitating collective action and innovation, frequently through simultaneous competition and cooperation.

Trust within networks is fundamental for successful tourism innovation, but for trust and reciprocal behaviour to develop, strong relationships are necessary (Tracey & Clark, 2003). When network ties are based on trust, which characterises many of the ties between tourism SMEs, the exchange of resources and information is facilitated, contributing to the increase of firms' overall and innovation performance, constrains opportunistic behaviour and reduces the cost of finding new partners (Semitiel García, 2006; Storper, 1997; Tsai & Ghoshal, 1998; Uzzi, 1997). In this regard, communities of practice are considered to be an important mechanism to enforce the creation of social capital, such as trust, shared vision and social interactions (Molina-Morales & Martínez-Fernández, 2010). They are cross-firm associations that connect people beyond business relations and thereby increase the strength of ties between them. These informal ties often result in strong networked business relationships.

Firms' innovative output may also be a function of the number of direct ties they maintain. Ahuja (2000) distinguishes between three benefits: (i) knowledge sharing, (ii) bringing together complementary skills from different firms, enhancing knowledge bases; and (iii) scale economies in research that arise when larger projects generate more knowledge than smaller projects (involving thus more direct ties). A high degree centrality (number of direct ties), besides being critical for information and resource access, sustains R&D collaborations that generate attention and attracts other partners. These enhanced diversity, experience and centrality are the main drivers of a networked innovation process (Powell et al., 1996; Powell & Grodal, 2006).

In what relates to innovation networks, one of the most discussed topics relates to their structure in terms of density and strength of ties, as already approached. Dense versus sparse networks, strong versus weak ties will provide different benefits and disadvantages and foster different outcomes in terms of innovation performance.

Cohesive or dense networks occur when all actors are connected to each other. This creates the atmosphere for higher levels of trust and norms of reciprocity (Coleman, 1988); redundant channels of information, because if actors are connected to each other, there are several different ways through which information can travel, facilitating the transfer of information and tacit knowledge throughout the network in a quick and reliable way (Uzzi, 1997); governance mechanisms that promote information flow and knowledge sharing (Krackhardt, 1992). On the other hand, too closed networks can place its member in a lock-in scenario. The over-

embeddedness in a particular and limited network prevents its actors from searching from new partners outside the network and thus accessing to new information, knowledge and ideas. They become locked in those strong ties, restraining and hampering their potential for innovation.

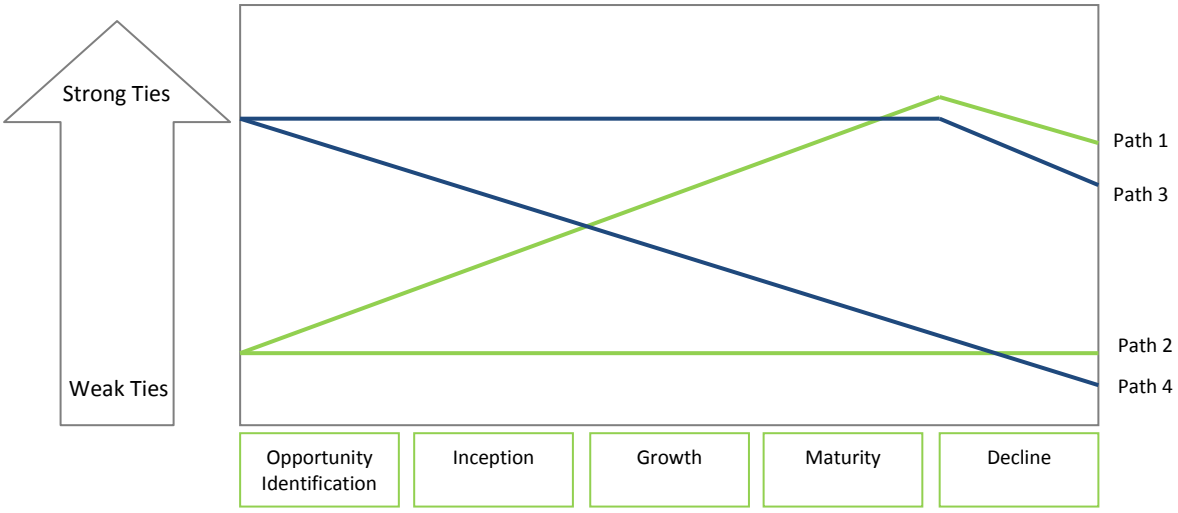
Conversely, a network characterised by a sparse structure with the presence of weak ties will benefit from the privileged access to new and unique knowledge and innovation opportunities, namely through brokers filling structural holes (Burt, 1992; Granovetter, 1973). In this context, people with different backgrounds, different perspectives or even working in different industries will exchange knowledge and information, learning from each other, and enhancing the potential for new combinations of knowledge into innovative products and services. Nonetheless, this type of network structure may bring detrimental effects to innovation, as it prevents strong and deep ties which are necessary to understand and to transfer tacit knowledge.

In sum, an adequate combination of both strong and weak ties, within the same network seems to be the most fruitful scenario for innovation. Bearing this in mind, Burt (2001) asserts that despite brokerage across structural holes is the source of added value, network closure is critical to optimise the value of structural holes. In this line of thought, several authors argue that groups will achieve a higher performance when spanning structural holes beyond the group and strong relationships among network members, integrating a network made of both strong and weak ties (Ahuja, 2000; Powell & Grodal, 2006; Semitiel García, 2006; Tracey & Clark, 2003). This will prompt, simultaneously, the access to different and novel information, knowledge, resources and skills (furthering innovative ideas) and the diffusion of these throughout a network that is cohesive and mobilised towards the actual development of innovations. While structural holes benefit network actors due to the access to new knowledge, ideas and information from "outsiders", the knowledge transfer process within the network is facilitated by closer ties. Ruef (2002) found that individuals located in heterogeneous networks, made of strong and weak, direct and indirect ties, are considered to be more innovative than those in homogeneous networks.

Tracey and Clark (2003) introduced an interesting perspective by analysing the evolution of ties along the life cycle of the networked innovation process (Figure 4.13). In the case of weak ties, firms or networks begin the process by sourcing ideas and opportunities from other firms or networks with which they have weak relationships. If the participants decide to effectively

collaborate for innovation development, these links may become closer and be transformed in strong ties (path 1). If the relationship is maintained through the single knowledge and information exchange, ties will remain distant (path 2). When considering strong ties, innovation results from close relationships between actors of a network with shared values and ways of working. Strong ties are necessary for most of the innovation process stages (path 3). Despite this, they may be required for the identification of opportunities and then evolve into weak ties over time (path 4).

Figure 4.13 – Framework of evolution of strong and weak ties along the innovation process



Source: adapted from Tracey and Clark (2003, p. 6-7)

Within this same line of thought, Swan, Scarborough and Robertson (2003) relate types of networking (global/inter-organisational vs. local/intra-organisational) to particular episodes of innovation process (invention, diffusion and implementation) and to processes of knowledge transformation. The authors found that during the invention stage, the focus is on social construction and creation of new knowledge. The relationships are developed within a local (regional) or intra-organisational narrow group. While the episode evolves, this group attempts to identify potential network participants with information and expertise relevant for innovation. When entering the diffusion stage, the focus changes to the communication of knowledge through global or inter-organisational networks in order to legitimise them and to make them accepted by the wider community. Finally, the implementation stage addresses the local appropriation of new ideas. Networking is more purposeful as the involved actors try to mobilise

the information and resources (including political and social) required for the development of the innovation.

It is concluded, thus, that network structures change over time, as well as individual actors' positions and roles within the overall network and in the innovation process. Therefore, a key characteristic of network relationships developed towards innovation is ***flexibility*** in the construction and reformulation of the network structure and action. When flexibility is absent, the role and behaviour of network actors become routinised, norms and ways of thinking are taken for granted, imposing artificial restrictions and actors become prisoners of a frame of reference centred in group cohesiveness (lock-in effect) (Tracey & Clark, 2003). Besides flexibility, Gulati (1998) argues that building trust with network partners, regular information exchange, constructive management of conflict and continuity of boundary personnel (responsible for the interface between the organisation and the network) are also critical factors for the success of innovation networks.

Based on previous theories, Bellandi and Caloffi (2010) synthesised the features that seem to be most influential for networks innovative potential. The first relates to the importance of *heterogeneous networks*. When actors have a different nature, knowledge base and competencies, the developed interactions bring benefits in terms of information diffusion, resource sharing, access to specialised assets and inter-organisational learning. Second, the already explored *balance between weak and strong ties*. This balance, by assuring combinations of similarity and dissimilarity between actors, are conductive to information and knowledge diffusion and innovation. They develop in a mixture of local clustering and distant relations (external sources of knowledge). Third, the authors highlight the *balance between stable and temporary members* of the network. Stability enhances trust and reciprocity among actors and temporary members often bring new knowledge. Finally, it is crucial to assure *the action of bridging organisations*, as they operate as the interface between near and distant agents, facilitating the network expansion and filling structural holes.

The formation of inter-organisational networks is driven by exogenous resource dependencies that prompt organisations to search for cooperation, and by endogenous embeddedness dynamic in which the emerging network gradually orients the choice of partners. Thus, networks are evolutionary products of these ties and as a result, new ties are influenced by the existing ties

where they are embedded (Gulati, 1998). The innovation network is constantly evolving, not only due to relational factors, but also in result of the specific goals, tasks to be developed or information need in order to innovate. There is sometimes the tendency for networks to preserve and strengthen the existing structure and patterns of interaction. However, the more stable it becomes, the more the network will tend to specialisation and the less capable it is to achieve diversity by constraining new linkages and the ability to further innovate (Vonortas, 2009).

In tourism, the importance of networks of collaboration is vast and gains increased significance. Costa (1996) emphasises the following benefits of networks for tourism management and planning:

- Provides an organisational framework with more comprehensive, participatory and informed approaches, where policies are not exclusively designed by planners, but supported by a wider variety of participants;
- The development of destination areas is conceived in a long-term economic approach, within a wider perspective embracing natural, social and economic environment, uniqueness, carrying capacity, and sustainable growth;
- Networks and clusters bring long-term economic growth, sustained by an increased stability, competitiveness, safety and profitability;
- Networks bring governments the advantage of tourism being approached with respect for natural, cultural and social patrimony;
- Tourism development considers local economic structures, and thus direct, indirect and induced tourism economic impacts are stimulated by the horizontal coordination of policies.

It is clear that collaboration and networks of tourism organisations increases the innovative capacity and performance of tourism industry, especially due to the transfer of knowledge and experiences (Pechlaner, Fischer, & Hammann, 2006; Rønningen, 2010; Sørensen, 2007). Networks and are thus antecedents of tourism innovation, necessary conditions for innovation to occur, and not consequences as defended by Mattson et al. (2005).

Tourism is, as previously discussed, fragmented in its nature, as it integrates several distinct activities which complement themselves in creating an integrated experience in a destination, is geographically dispersed, origin and destination areas are distant and resources are used jointly

as they are free. In this regard, networks provide important benefits, as they compensate this segmentation in bringing together tourism stakeholders and providing tourist with comprehensive experiences. Moreover, the tourism business' environment is turbulent and very competitive, meaning that growth or even survival of firms might depend on collective action (Scott, Baggio, et al., 2008). A study on SMEs operating on sports and adventure tourism demonstrates a gradual association to networks, as they bring several main benefits, namely a higher representativeness and credibility, influence near governmental bodies, the provision of technical support and training, the access to updated information on tourism, knowledge exchange, the possibility of engaging in strategic partnerships, access to institutional and legal support, joint promotion, etc. About 66,6% of the surveyed firms consider that networks are important or very important in the promotion of innovation (Costa et al., 2008).

Another study developed on a peripheral Portuguese area (Caramulo) and on the public/ private investment dynamics in tourism concluded that the implementation of several integrated projects resulting in a comprehensive tourism network can promote socioeconomic development in an area with relatively few opportunities. This associative network of private and public sector investments represented an important innovation process capable of providing sustainable development and increased regional competitiveness through *"the foundation of a tourism cluster in the area, as a critical mass of enterprises, skills and supporting structures (…) in a dynamic process*" (Breda et al., 2006, p. 81).

According to Tinsley and Lynch (2001), when addressing destination networks, the destination must be considered as a whole system, as previously supported, with inputs and outputs, which also applies to the systemic innovation processes. The authors argue that networks are the frameworks that bind the place and people together, going beyond the destination level to the regional, national or even international.

Mattsson et al. (2005) propose a model of an innovation system based on an *attractor*, that is, an event, activity or organisation that attracts visitors. The attractor is then involved in a certain context and identity, becoming the *scene*, which is the framework for the experience provided to visitors. This scene is created by the *scene-maker* (person, private or public organisation), the innovator who initiates the process by identifying the opportunity of using the attractor in order to increase visitation. To ensure a long-term effect of this innovation, it must be maintained by a

scene-taker, which demands for the involvement of other firms and actors. Similarly to the scene-maker, it can be a person or organisation willing and able to carry on the previous work. Local tourism businesses can benefit from these activities by taking part in a network emerging on the scene. From this point on, subsequent innovations are necessary in order to renew the scene. According to the authors, the scene-taker is the most important function within this framework. However, networks and structures set on collaboration among different players are a necessary condition for the scene to be maintained and rejuvenated and for a successful use of the attractor.

There are also advantages deriving from different network structures and tie patterns. Pavlovich (2003) confirms that the denser the ties, the higher the cohesion and thus the conformity and inclusion. On the other hand, sparse ties may exclude actors, but bridge structural holes with external players and foster the importation of new knowledge into the region, boosting innovation. International actors play a significant role within this context.

4.2.6 Knowledge and Learning within Tourism Innovation Systems

"Innovation, perhaps more than any other economic activity, depends on knowledge."
(Feldman, 1994, p. 1)

"(…) in regional innovation systems work, innovation is the focus, but knowledge, especially from research, is the key driver." (Cooke, 2007, p. 186)

Traditional neoclassic economic models focused on labour, land, natural resources, capital, energy, etc. as production factors. However, modern approaches introduced major changes to this point of view. The New Growth Theory considers knowledge as the driver of economic performance. This analytical approach is based on Paul Romer's work, who proposed a change to the neoclassic model by placing technology and the knowledge on which technology is based as key elements of the economic system and included in production factors (Jaffe & Trajtenberg, 2002; OECD, 1996; Romer, 1986). In this perspective, OECD confirms that *"(…) the role of knowledge (as compared with natural resources, physical capital and low skill labour) has taken on*

greater importance. Although the pace may differ, all OECD economies are moving towards a knowledge-based economy" (OECD, 1997a, p. 7). Thus, knowledge is now seen as an economic asset, and one that is renewable, as the stock of knowledge is not run down by use; on the contrary, its value increases as it is created, improved and shared with others. This perspective has been evolving from a knowledge-based economy towards a knowledge-based society, as one may observe a growing proliferation of knowledge communities or networks linked to scientific, technical and business professions, characterised by intense knowledge production and reproduction capabilities, a space for learning and for intensive used of ICT (OECD, 2004).

But is tourism a knowledge-based industry? Despite the fact that linkages between knowledge producers (universities, research centres) and tourism organisations may be considered to be lacking, when compared to other industries, this type of linkages and cooperation is increasing, as universities and researchers are closer to society and contributing to solve its problems. On the other hand, firms are less resistant to scientific knowledge. Moreover, they are conducting their own knowledge creation processes, which in an ideal innovation system, should be transferred to other organisations in order to promote leaning and innovation.

To this regard, after having analysed the characteristics of knowledge-based economies, Pizam (2007) concluded that tourism is indeed a knowledge-based industry, mainly due to the following features:

- More people work in offices than in front line positions;
- High and low-skill jobs had grown, at the same time that mid-skill jobs diminished;
- Tourism and hospitality are, by definition, at the centre of globalisation of trade since a large part of clients are international tourists;
- There is an increase in foreign direct investment, as many tourism firms are multinational corporations;
- There is a significant growth in entrepreneurial and innovative firms, both large and small;
- There is an intense competition due to several factors, especially the internet, the increase of small and innovative firms and the development of new tourism destinations;
- Collaboration among competitors in order to develop an integrated tourism product/ destination with high quality standards, joint promotion and marketing strategies, and reduction of costs;
- Persistent turbulence with new firms being born and others that cease to exist everyday;

- Large and increasing choice of tourism products and services, to a large number and types of consumers;
- Speed in innovating and in reaching markets as an important competitive advantage;
- Proliferation of information technology products and services, which have completely transformed tourism industry by lowering costs of computing and data transmission, improving productivity and altering its value chain.

Despite the fact that knowledge, learning and innovation were sometimes associated with activities as investment in R&D or with the adoption and creation or pioneer technologies, the fact is that knowledge creation and learning are essential in the (usually regarded as) low- and medium-tech or traditional industries. Knowledge creation, learning and innovation can occur when individuals perform day-to-day operations as well, such as marketing, sales, logistics, etc. (Malmberg, 1997; Maskell, 1998). It is thus fundamental to improve the knowledge base of tourism destinations in order to increase competitiveness and innovation. However, most of literature and application on knowledge management concerns individual organisations. Despite the fact that it can be applied to destinations, if it is to be an effective tool, one must consider a framework at tourism destination level, embracing knowledge creation and flow among network members (Scott, Baggio, et al., 2008).

Knowledge is intrinsically connected to innovation and learning. Innovation is an interactive process dependent on knowledge; it is its most fundamental resource. One of the assumptions of innovation systems is the existence of interactions that result in the production, diffusion and use of knowledge (Feldman, 1994; Lundvall, 1992). Innovation and the discovery of the new involves using existing knowledge, which involves learning. In turn, innovation also embraces sharing learned knowledge, resulting in a social constructed process of mutual exchange of knowledge and shared learning (Howells, 2002).

Several distinctions have been made in order to categorize different types of knowledge that are important for innovation. A seminal perspective is the one developed by Polanyi (1966) who distinguished codified (explicit) from tacit (implicit) knowledge, according to the degree of formalisation and the need for physical presence in knowledge creation.

Accordingly, explicit or codified knowledge is transmittable in formal language. Codifications allows its transformation into information that is easily shared through formal means such as written documents, publications, patents, e-mails, oral presentations, blueprints or manuals (Breschi & Lissoni, 2000). However, "*we can know more than we can tell*" (Polanyi, 1966, p. 4), and this makes the distinction between codified and tacit knowledge. Tacit knowledge is related to experiences that are not codifiable. It represents a know-how that is acquired through the informal learning of behaviour and procedures. It concerns an unconscious assimilation of things from outside, and it may also involve innate skills, common beliefs and codes of conduct. Informal means such as face-to-face communication, personal training and staff mobility may be some of the ways in which tacit knowledge is acquired. It cannot, thus, be easily transferred as it demands for a specific and individual performance (Howells, 2002).

It seems therefore possible, to a certain extent, to distinguish between a local, embedded, person-embodied and context dependent knowledge, from more global types of knowledge (Morgan, 2001), or to what Markussen refers to as the *stickiness* of some forms of knowledge and learning processes as the abilities of particular regions (Markusen, 1996) which are closely linked to territories and to people who comprise them. The local versus global knowledge issue and its consequences for knowledge creation and innovation is closely linked to the structure of networks previously presented. *Local buzz* (tacit knowledge transfer within local milieus) and *global pipelines* (codified knowledge travelling through worldwide communication channels), as defined by Bathelt et al. (2004), should co-exist in order to provide organisations with particular advantages and unique conditions for innovating and avoiding the lock-in effect. However, bearing this in mind, one may conclude that industries that are more reliant on codified, scientific knowledge, present knowledge spillovers that are more globally widespread (as the knowledge involved is easily transmitted) and less geographically localized. Conversely, industries that depend on tacit knowledge, know-how, know-who and learning by doing, display knowledge spillovers that are more localised (Howells, 2002). This is the case of tourism industry which, in addition to these features, holds a relationship with the territory that may be stronger than other cases, as it is its main resource and base for development.

Gertler (2003) elaborated an interesting discussion regarding tacit knowledge production, appropriation and reproduction and the importance of geographical proximity. Among several

interesting findings, he presents three perspectives for overcoming tacit knowledge and geography related problems:

i. **Learning regions**, where tacit knowledge sharing occurs through face-to-face interaction between innovation partners who already share a common language, codes of communication, conventions and norms, trust and they know each other from previous collaborations. Spatial proximity is the key or the main driver for the subsequent processes of trust and personal relationships to develop;
ii. **Communities of practice**, which are groups of workers that are informally bounded by shared expertise, professional interests or experiences. Similarities play an important role. Beyond geographical proximity, in these types of communities one may find organisational or relational proximity, which facilitate the creation and transfer of tacit knowledge;
iii. **Knowledge enablers:** individuals who span boundaries within the organisation acting as agents to diffuse tacit knowledge with at least partial codification in the process of transmission, which is supported by personal interaction.

Several studies provide important conclusions confirming that, regardless of knowledge being tacit or codified, there are localised patterns of interaction, suggesting therefore that tacit knowledge and geographical location play an important role on the transfer of codified knowledge (Audretsch, 1998; Audretsch & Feldman, 1996b; Feldman, 1994; Jaffe et al., 1993). Studies on knowledge spillovers demonstrate that new knowledge is shared more rapidly among individuals that are spatially proximate (Feldman, 2000). Amin (2000) argues that the local is a unique source of tacit knowledge for competitive advantage. However, it may not be totally immobile and hopelessly confined to a specific location, (…) "*but it is person-embodied, context dependent, spatially sticky and socially accessible only through direct physical interaction*" (Morgan, 2001, p. 15).

Apart from this distinction, Polanyi's work seems to have been misinterpreted when dichotomising 'codified-tacit' knowledge. The idea is that both types of knowledge should be seen as a continuum, and that explicit knowledge needs tacit knowledge to exist in order to be interpreted. Moreover, Nonaka and Takeuchi (1995) provide a framework where these complementary dynamics are highlighted, proposing that knowledge can be created and transformed through four interactive processes:

- Socialisation: tacit to tacit knowledge transfer, where ideas are discussed and exchanged;
- Externalisation: knowledge is transformed from tacit to explicit form;
- Combination: explicit to explicit (e.g.: from a paper to a database);
- Internalisation: explicit to tacit, generating new ideas from written documents, learning-by-doing, applying written procedures to a new machine.

The authors also advert that despite tacit knowledge may be progressively converted into more accessible forms of knowledge through collective learning processes, codification is a difficult organisational exercise.

Table 4.4 – Types of knowledge and related learning processes

Types of Knowledge	Definition	Related Learning Processes
Know-what	It is about facts, or what is usually called "information" (e.g. how many tourists visited Portugal in 2010).	Reading publications, attending lectures, accessing data bases, statistics, technical manuals, etc.
Know-why	Knowledge about principles, laws and structure of human mind and society. Closely related to advances in certain science-based areas.	
Know-how	Skills, ability to do something. May relate to manual or intellectual skills. It usually exists within firms or research teams; however, increasing collaboration networks are expanding know-how among their members and creating a composite knowledge base.	Access to several different sources of knowledge from daily relations with network members allows creating and developing a composite knowledge base. Learning through apprenticeship and social practice.
Know-who	Information about who knows what and who knows to do what. Also involves the social skill to cooperate and communicate with different kinds of people.	

Source: own elaboration based on Lundvall and Johnson (1994) and Jensen et al. (2001)

Although the "codified-tacit" knowledge is the most widely used and acknowledge categorisation, alternative classifications emerged, providing different perspectives about their impacts on innovation and learning processes. Other authors provide a more intricate distinction of knowledge types, dividing them into know-how, know-why, know-how and know-who, demonstrating that learning each type of knowledge occurs in different ways and channels and have distinct impacts on innovation (Gregersen & Johnson, 1997; Jensen, Johnson, Lorenz, &

Lundvall, 2001; Lundvall & Johnson, 1994). Know-what and know-why are proximate to codified knowledge, while know-how and know-who relate to tacit knowledge (Table 4.4).

According to Jensen et al. (2001) there are two types of innovation: Science, Technology and Innovation (STI) mode, based on the creation and use of codified and scientific knowledge and thus connected to know-what and know-why; and the Doing, Using and Interacting (DUI) mode, which relies on informal learning and know-how based on experience (know-how and know-who). In a similar approach, Asheim and Coenen (2005) distinguish between "analytical" and "synthetic" knowledge bases, referring that innovation processes depend on these distinct typologies. In analytical knowledge, scientific knowledge is extremely relevant. Its use results from R&D and from the creation of new knowledge, and therefore university-industry links and networks assume a greater importance and recurrence. Codification of knowledge is frequent, as its inputs are based on formal scientific principles and models, as well as the outputs are documented in publications or patents. Radical innovations are more common, in the form of new products and processes and spin-off firms are an important channel of knowledge application. When involving synthetic knowledge base, innovation is mainly incremental and develops through the application or the new combination of existing knowledge. Although R&D may be less important than in analytical knowledge, it occurs in the form of product or process development and university-industry links develop mainly in the form of applied research. Knowledge is created through experimentation, practical work and inductive processes (learning by doing). Tacit knowledge, in the form of know-how and practical skills, appears to be more present in this type of knowledge base.

The systemic and successful links within regional innovation systems result from the sharing of tacit knowledge and the resulting embeddedness of social networks. These links are usually informal, implicit, relational and cultural among the networks' different actors. Thus, networks are an extremely relevant source of knowledge creation and diffusion, enhancing learning and providing access to knowledge bases that would otherwise be unavailable. Accordingly, the degree to which firms learn, acquire knowledge and innovate is a direct function of the degree of active participation in the network. Tourism industry organisations are characterised by being rich in tacit knowledge, which is the basis of their competitive advantage. The generation and use of new knowledge to boost innovation and new tourism products is critical for the competitiveness of both tourism destinations and enterprises. However, they often do not share it, in result of

wanting to maintain their advantage towards competitors (Cooper, 2006). The transfer of knowledge is not an easy process, especially when it concerns transforming tacit into codified. In fact, it is widely accepted that tacit knowledge represents about 80% of the knowledge of an organisation, and out of these, only 10% to 20% goes through a transfer process (Scott, Baggio, et al., 2008).

It is known that knowledge sharing may occur spontaneously, through informal contacts and unstructured processes. However, for effective knowledge transfer to occur, organisations should participate and be embedded in tourism destination networks which allows agents to control the level of access to knowledge.

The degree of knowledge creation within the network/ system through informal relationships may be low at the early stages of lifecycle (when interaction is in the beginning), grow along with the increase of mutual understanding, and become saturated in the long term when innovation sources are fully explored (Chang & Chen, 2004). In tourism industry, the extent of knowledge sharing is influenced by the level of embeddedness of knowledge in the structures, roles and procedures of individual members of the group. Moreover, learning and knowledge sharing processes are set in motion due to the anticipation of a threat, such as the decline in the number of tourists (Halme, 2001).

In this context, knowledge is an extremely relevant economic asset when discussing geographical proximity. Breschi and Malerba (1997) refer to the "knowledge spatial boundaries of firms' innovative process" to address the geographical location of knowledge accessed by innovative firms and the geographical boundaries within which they are able to search for new knowledge. This strong influence and relationship between knowledge and geography is well synthesised by Howells (2002), who argues that knowledge is centred on individuals who are influenced by their geographical environment and relates to cognitive, social, cultural and economic features. By its turn, the development of a knowledge set is influenced by human interaction which is also shaped by place and distance. This knowledge set requires external codified and tacit information, whose acquisition is also constrained by distance (namely costs and barriers). Learning, as the main process for knowledge creation, is influenced by geographical and related contexts, resulting from an interactive, collective and location-specific process. Finally, information or codified knowledge

are filtered and interpreted according to pre-existent tacit know-how, which is shaped by experience and geography.

Innovation processes are based on the utilisation of existing knowledge, but frequently require the creation and acquisition of new knowledge, which involves learning. Learning is an interactive process where agents cooperate and communicate in the creation and use of new knowledge or in the (re)combination of different pieces of knowledge into something new (Gregersen & Johnson, 1997; Lundvall, 2007).

While explicit knowledge is easily accessible, in order to acquire tacit knowledge there are some critical learning mechanisms that should be assured, such as "learning by doing", that is, by the practice and repetition of a task (Arrow, 1962); "learning by using" (Rosenberg, 1982) assumes that practices are borrowed from elsewhere and then used and adjusted to other realities; "learning by interaction" with individuals from different backgrounds and skills (Lundvall, 1995), which appears to exist in a well developed learning culture and "learning by learning" when cooperation networks are already established and operate on a basis of monitoring and continuous improvement as they apply the "institutional memory and intelligence" to the systems' constant adjustment to their wider environment (Stiglitz, 1987, cit in Cooke, 1998). Learning-by-learning processes are on the basis of the learning regions.

Gregersen and Johnson (1997) distinguish learning processes in direct and indirect learning. Direct learning comprises a systematic and organised process where universities, research institutes and R&D departments develop and utilise new knowledge. Indirect learning is a rather more spontaneous and unintended event resulting from regular activities developed in firms, such as marketing, sales or production.

The notion of direct learning highlights the role of the so-called science system in systemic innovation. It includes universities and other higher education institutes, research centres, government science ministries, research councils, firms and supporting infrastructure and has three main functions (OECD, 1996):

i. **Knowledge production:** production of new knowledge through research. This scientific knowledge is often discriminated from commercial or applied research knowledge. It is frequently considered as a public good, and the government has responsibilities in

ensuring and subsidising the creation of science to improve social wellbeing. Others defend that this distinction is no longer meaningful due to the propagation of scientific methods through an increasingly educated society. The traditional base of science system, confined to universities and research centres, can no longer be assumed to dominate scientific knowledge production. If private organisations invest in research and development, there is a need for policies prompting the interaction among all sources of knowledge.

ii. **Knowledge transmission:** particularly through the education and training of scientists expanding the available stock of knowledge-workers, by fostering learning and the development of human capabilities for learning new skills and applying them which is crucial for absorbing and using new knowledge.

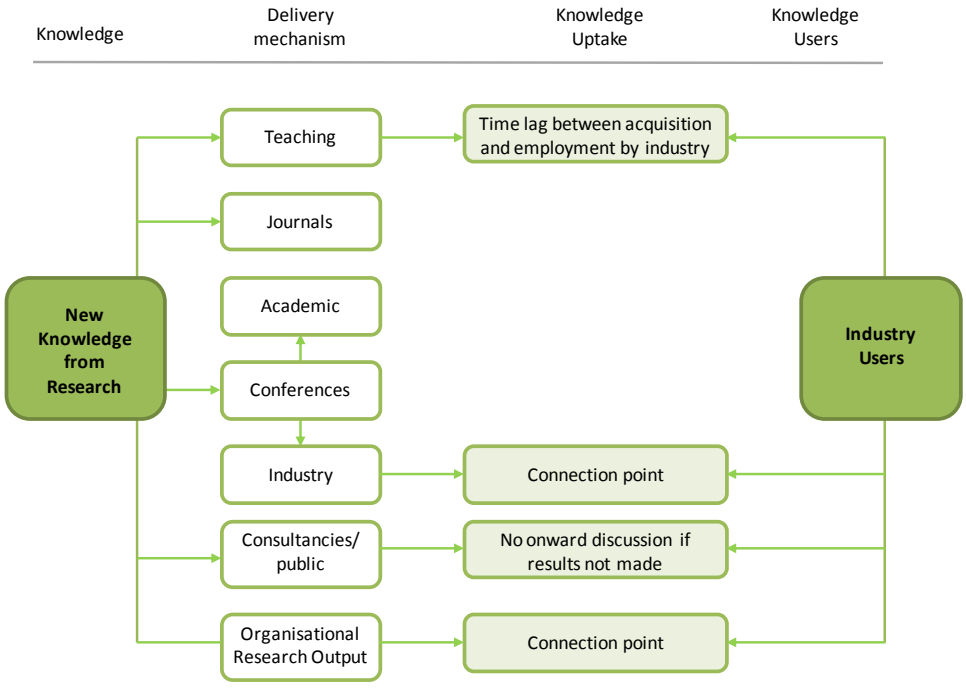
iii. **Knowledge transfer:** science system must also be an active part in disseminating the produced knowledge to economic and social actors. However, for this to occur, the science system itself has to encounter ways of adapting knowledge for entrepreneurial use, as well as to develop bridging mechanisms with community, such as university-industry collaboration in joint research projects.

Cooper (2006) acknowledges that globally tourism has failed to implement an approach of knowledge creation and diffusion. This occurs for two main reasons: first, tourism knowledge producers (researchers, consultants, academics) belong to a community of practice which often does not include practitioners. This results in poor linkages between firms and academic research. Second, many of the prior conditions necessary for successful knowledge transfer and adoption are frequently absent in tourism destinations. According to Scott, Baggio, et al. (2008), this situation reflects some of the specific characteristics of tourism, such as the dominance of family-owned SMEs, the high fragmentation across various activities and the nature of tourism employment: seasonal, part-time, high turnover and low qualifications, which inhibits knowledge absorption. In result, the stocks of knowledge (things that are known) and flows of knowledge (means by which knowledge is communicated) may be weak at certain tourism destinations. It is thus fundamental to have a clear understanding of the adoption environment and conditions.

The knowledge that results from research is increasingly found outside the corporate sector and inside knowledge intensive research institutes, consultancies and regionally agglomeration of firms. These agglomerations should assure that dynamic knowledge networking capability is

transformed in a regional skill or asset which in turn attracts other firms. A firm located in an agglomeration rich in knowledge resources has a higher growth potential than if it is located in a less endowed region (Rosenthal & Strange, 2003). If this is true for manufacturing, it is even more important for tourism. Tourism firm are highly dependent on geographic location, as destinations are unique and tourism products are immobile. Therefore, tourism network agents should realise that a mentality of community and knowledge sharing as features of their organisational personality brings important competitive advantages, attracting new firms and fostering the innovation process.

Figure 4.14 – Diffusion of tourism research



Source: Cooper, Jago, Carlsen, and Ruhanen (2006, p. 1)

Within regional innovation systems, two important knowledge-related processes can be distinguished: one engaged in knowledge exploration or generation (research), the other involved in knowledge exploitation (commercialisation). While successful RIS have a set of organisations conducting research that generate new knowledge and firms that commercialise this knowledge as consumable innovations, unsuccessful RIS present deficiencies that relate to (i) the (poor) quality of information, (ii) the fact that knowledge institutions are learning oriented, instead of research oriented, meaning that little research is developed and even less conductive to

innovation and (iii) one or other of the Triple Helix partner dominates knowledge and innovation asymmetrically (Cooke, 2007). In sum, for a regional innovation system to be competitive, it should comprise a strong, dynamic and collaborative knowledge infrastructure, made of public and private organisations and institutions whose role is to produce, maintain, diffuse and protect knowledge. It includes universities, schools, training systems, research laboratories, trade publications, collective technical standards, private R&D, research councils, libraries, databases, etc. (Gregersen & Johnson, 1997; Smith, 1997).

Knowledge resulting from research should therefore reach organisations and firms to be transformed to innovative commercial tourism products or in innovative processes. Knowledge creation is an important process within tourism innovation systems. However, if knowledge does not flow through appropriate channels, collective learning and destination-level innovation may be harnessed.

Cooper (2006) analysed several models of knowledge transfer and concluded that the model of absorptive capability appears to be the most relevant. It acknowledges that organisations must respond to external inputs, which will be partly influenced by the existing knowledge stock. The greater it is, the more effective will be the assimilation of new knowledge. This brings the question of SMEs, as they are the majority of firms in tourism systems and extremely relevant for their competitiveness. The transfer of knowledge among tourism SMEs demonstrate that networks are more relevant and valuable in this process when compared with consultants or other agents, as SMEs prefer to have contact with people working in the same field. Among similar tourism firms or firms with similar tourism products, the knowledge gap is reduced, which facilitates learning and the absorption of the transferred tourism knowledge (Weidenfeld, Williams, & Butler, 2010). However, too similar knowledge bases can cause myopia and lock-in effects, diminishing the innovative potential of tourism firms and the overall destination. Product similarity is useful, but firms should also develop links with firms from other sectors, other tourism subsectors, or from distinct geographical areas in order to acquire new knowledge and expand ideas for innovative tourism products, services and processes. A study developed by Asheim et al. (2003) concluded that due to their small size, SMEs often resort to other firms and universities in order to innovate. Moreover, those who innovate through new scientific knowledge tend to collaborate with worldwide partners, while those who innovate through user-

producer learning usually link to nearby agents. In this case, innovation involves the application or new combination of existing knowledge.

Moreover, the existence of "knowledge networks" integrating tourism SMEs gains even a greater importance if one consider that these firms tend to present limited absorptive capacity for acquiring and using tacit knowledge. Trust and social capital mechanisms are more effective. Cooper (2006) argues that intermediaries, such as tourist boards, may facilitate the creation of linkages among agents and knowledge transfer between them. However, these top-down initiatives often fail as they are unable to create the necessary trust that underlies knowledge sharing processes.

Knowledge transfer and learning are therefore related processes that allow the creation of stocks of knowledge organisationally embedded. But how does knowledge, namely tacit knowledge, flows within tourism networks? Which channels provide the means for the dissemination of knowledge prompting innovation?

- **Labour mobility** is often identified in the literature as a very important mean for knowledge transfer and knowledge spillovers, not only in manufacturing (Dosi, 1988; Marshall, 1890), but especially in tourism where staff mobility is high (e.g. due to seasonality). In tourism destinations (geographical tourism clusters), workers move easily between firms, transferring the embodied tacit know-how and changing the organisations' knowledge base. The knowledge is effectively transferred through the physical displacement of individual workers between firms with different knowledge bases (Shaw & Williams, 2009; Sørensen, 2007; Weidenfeld et al., 2010). However, for this to occur successfully, the receivers should present an adequate absorptive capacity, the cognitive barriers should be reduced (Beesley, 2005; Hjalager, 2002) and knowledge bases should be compatible enough to engage individuals in collective learning.
- **Networks** of collaboration are, by their own definition, the main vehicle for knowledge to be diffused through the agents of tourism destinations. When inter-firm cooperation exists, new knowledge is created and individual knowledge is shared, both in formal R&D projects or informal relationships (Breschi & Malerba, 1997; Dosi, 1988). This may occur in vertical or horizontal networks. Networks may take the form or co-exist, with structures

such as communities of practice, learning regions, or integrate specific types of economic agglomerations.

- **Knowledge brokers**, influential individuals (or firms, in some cases) who operate in distinctive knowledge communities and play a key role in knowledge transfer such as consultants (Hall & Williams, 2008; Hargadon, 1998).
- **The learning process** is itself a mechanism for knowledge transfer. When individuals learn by doing, using or interacting, a channel for knowledge dissemination is created. This type of "informal" learning is extremely relevant for tourism because innovative products and services are visible for competitors and patenting is very difficult and unusual. Formal education in higher education institutions or training schools is an important means for skills development, which enables absorptive capacity, and for knowledge transmission.

Hjalager (2002) considers that, in tourism, knowledge is transferred through four system-level channels. The author points the role of the **trade system** (comprising trade associations, employers' organisations, confederations, etc.) in diffusing research results, often resulting from cooperation projects with academic researchers, namely through trade press, meetings, conferences, workshops or advisory services. Moreover, they can directly interact with universities and research centres when they need to acquire new relevant knowledge. The **technological system** relates to the knowledge embodied in technology. The **infrastructural system**, represented by the tourism public organisations is in a privileged position to acquire and use new scientific knowledge. Finally, the **regulation system** helps to disseminate knowledge in the form of prohibitions, punishments or mandatory actions relating, for example, with food, hygiene or health.

However, despite the existence of these channels and the effective operation of tourism networks and innovation systems, there are some barriers that hinder knowledge creation and transfer. In spite of the already referred deficiencies in the linkages between universities, industries and government, Cooper (2006) adverts that the failure to transfer research results and new knowledge to end users may result from poor absorptive capacity of receivers or from carelessly designed projects that do not consider knowledge transfer channels or an appropriate codification in order to be effectively used by tourism organisations. Other issues such as the fragmentation of tourism SMEs, different cultures of distinct communities of practice or poor human resources strategies may also prejudice tourism innovation process.

4.2.7 Learning Regions

Learning regions emerge when the process of interactive learning becomes embedded in the regional network and is perpetuated through time (Florida, 1995), alongside with the process of regional learning networks and the institutional set-up operating as a system. Institutional set-up refers to territorial conventions, innovation policy and innovation supporting organisations (Asheim, 1995).

Moulaert and Sekia (2003) argue that the model of learning regions is very close to the one of regional innovation systems, although presenting a stronger focus on the institutional role and on the interaction between economic and socio-cultural life. The authors also consider that the learning regions theory is a synthesis of previous bodies of literature, key concepts and territorial innovation models, a perspective that is shared by authors such as Rutten and Boekema (2007a, 2007b). Accordingly, learning regions draw from:

- Innovation systems: where innovation is a geographically embedded process;
- Industrial districts: collective learning is the key to innovation and economic prosperity;
- Regional learning: spatial dimensions of learning processes;
- Networks and social capital: the organisation of learning process is based on the connectedness and relationships among economic and social agents; networks and the associational paradigm is central in combining economic geography and innovation (Morgan, 1997);
- Institutions of innovation: hard and soft institutions supporting innovation;
- The need for a set of diverse infrastructures – human, productive, physical, governance (as depicted by Florida, 1995);
- The existence of flexible division of labour, vertical disintegration, geographical concentration learning and knowledge creation as social processes and 'untraded interdependencies' as the behavioural basis for collective learning (concepts related to Storper's new industrial spaces).

Learning regions operate as collectors and repositories of knowledge and ideas (usually incorporated in research institutes and higher education facilities), providing the supportive infrastructure that facilitates the creation and flow of knowledge, ideas, continuous improvement and comprehensive learning, increasing regional productivity, performance and innovation.

Regions are increasingly the focal points of knowledge creation and learning as they move towards learning regions. These regions should display a dense network of firms and research institutions supported by social capital and trust, and a broad set of amenities able to attract highly skilled workers (Asheim, 1995; Florida, 1995; Rutten & Boekema, 2007b; van Geenhuizen & Nijkamp, 2000).

Table 4.5 – From mass production to learning regions

	Mass Production Region	Learning Region
Basis of competitiveness	Comparative advantage based on: ▪ Natural resources ▪ Physical labour	Sustainable advantage based on: ▪ Knowledge creation ▪ Continuous improvement
Production System	Mass production: ▪ Physical labour as source of value ▪ Separation of innovation and production	Knowledge-based production: ▪ Continuous creation ▪ Knowledge as source of value ▪ Synthesis of innovation and production
Manufacturing infrastructure	Arm's length supplier relations	Firm networks and suppliers systems as sources of innovation
Human infrastructure	▪ Low-skill low-cost labour ▪ Taylorist workforce ▪ Taylorist education and training ▪	▪ Knowledge workers ▪ Continuous improvement of human resources ▪ Continuous education and training
Physical and communication infrastructure	Domestically oriented physical infrastructure	Globally oriented physical and communication infrastructure
Industrial governance system	▪ Adversarial relationships ▪ Command and control regulatory framework	▪ Mutually dependent relationships ▪ Network organisations ▪ Flexible regulatory framework

Source: Florida (1995, p. 533)

> "*In a learning region, regional actors engage in collaboration and coordination for mutual benefit, resulting in a process of regional learning. Regional characteristics affect the degree to which the process of regional learning leads to regional renewing*" (Rutten & Boekema, 2007a, p. 136).

Tourism destinations present distinctive characteristics. For instance, they are very dynamic in terms of the networks' composition, as agents change frequently during the destination life cycle. Therefore, collaboration patterns should be flexible and goal oriented. The fact that tourism operates as an integrated system requires that the involved actors should combine resources in order to become regions that support processes of learning and innovation as key sources of competitiveness (Saxena, 2005; Schianetz, Kavanagh, & Lockington, 2007). Regions possess a

stock of tacit and specific knowledge that is exclusive to tourism destinations and gives them a competitive advantage. Tourism regional networks can develop a collection of interconnections for knowledge creation within destinations (Pavlovich, 2003).

An interesting perspective is the materialisation of collective knowledge and learning, as individuals are expected to work in or with teams, creating a "group social mind" and becoming collective agents of innovation, in opposition to knowledge embodied in a single individual, researcher or scientist (Florida, 1995). This results from an evolutionary process that grows alongside social capital and trust.

According to Schianetz et al. (2007), a Learning Tourism Destinations adopts lifelong learning as a principle and a goal for the community, organisations and individuals, promote collaboration between public, private and educational sectors and provide infrastructures to collect new information, disseminate, process and apply knowledge ,such as, for instance, effective and dynamic tourism observatories (Brandão, 2007).

Other important concepts that should be put into practice in order to create learning tourism destinations are connected to relationships and collective learning processes and refer to (i) relational exchange, which demands for social relationships amongst tourism providers; (ii) trust and commitment reinforcing social relationships resulting from business linkages; (iii) exchange of information based on honesty and open communication; (iv) exchange of economic nature promises; (v) shift of emphasis from products to people, organisation and social processes (Saxena, 2005).

Within the learning regions context, Lundvall's concept of "learning-by-interacting" implies that agents learn and adapt through interaction with others, which helps tourism organisations to gain competitive advantages in an industry that is highly turbulent, uncertain and rapidly changing.

In an almost symbiotic process, as destinations move towards learning regions, the organisations will change as well, because the territory can now provide the necessary infrastructures and environment required to support knowledge-intensive innovation and production processes. Knowledge and human capital will replace physical labour as the main source of value. This way, innovation will be perpetual and continuous (Florida, 1995).

4.3 Towards a Regional Tourism Innovation System

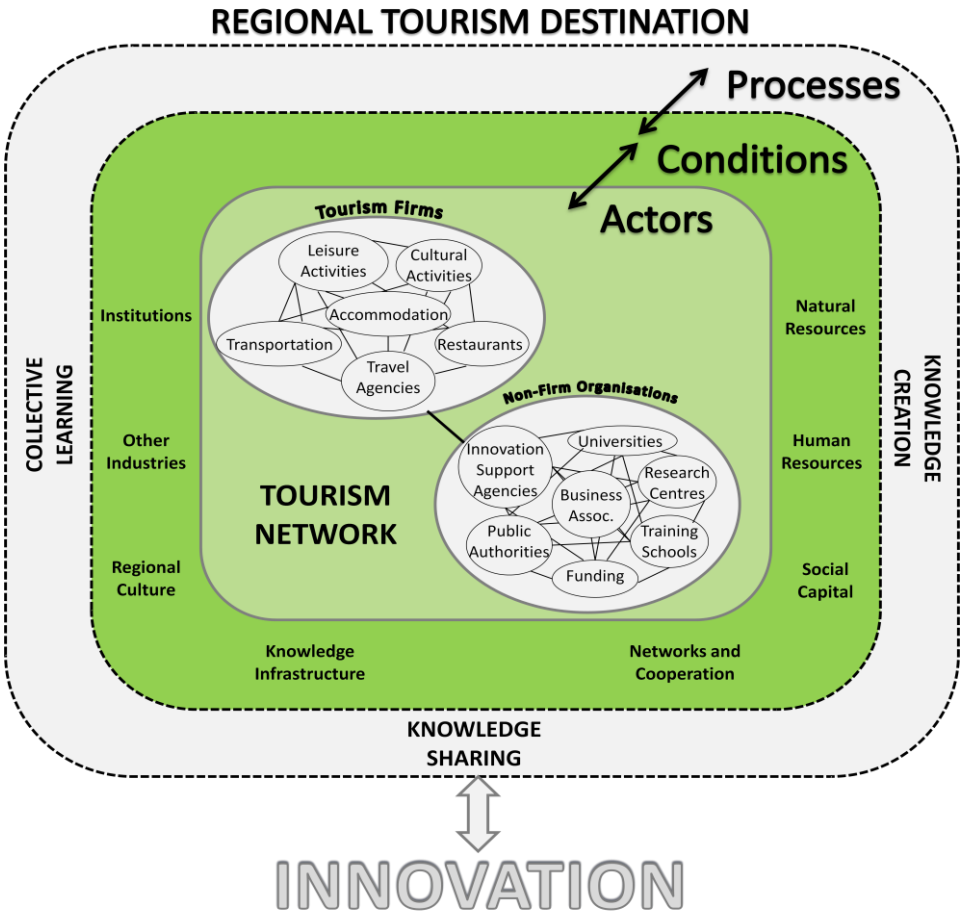
Considering the nature and composition of tourism industry and destinations and the underlying systemic approach, innovation in tourism should be conceptualised and implemented within a systemic approach embracing firms, organisations and territories. Bearing this in mind and after the analysis previously conducted regarding territorial innovation models, regional innovation systems appear to be the most suitable approach to the development of innovation in tourism destinations. In fact, there are several factors that justify the applicability of the model of regional innovation systems to tourism:

- **i.** Tourism is a system, comprising several economic activities, firms and organisations that interact among themselves, building an indivisible whole;
- **ii.** Tourism is an information-intensive industry, therefore relying on information and knowledge sharing processes;
- **iii.** Tourism is made of integrated experiences that are evaluated by tourists in an overall image, thus the interaction of all the elements comprising the system is mandatory in order to assure a good performance of the destination. Networks assume a fundamental role within this process.
- **iv.** Local and regional levels are considered as the central point of evaluation of tourism activities; it is where tourism impacts are felt, where the tourism policies and strategies are implemented and where the resources are assessed in order to develop innovative products, services and strategies.
- **v.** The territory and the local community cannot be disassociated from tourism and from innovation systems.
- **vi.** The triple helix concept, which intends to advance on and create synergies among the complementary skills and competencies from the academy, industry and government aiming at facilitating new collaborative processes for innovation and creative development, is being increasingly implemented in tourism. Universities, firms, organisations and public sector agencies are getting closer in the context of tourism development.

A Regional Tourism Innovation System presents *"(…) components/actors (firms and non-firm organisations), networked relationships among them, if these components and networks perform specific (innovation-related) processes that would not be performed if components were*

functioning in an atomistic way and if this structure could not be distinguished from the surrounding environments or systems" (Brandão & Costa, 2012, p. 77).

Figure 4.15 – Regional Tourism Innovation System's Framework



Source: Brandão and Costa (2012, p. 77)

The model in figure 4.15 represents an overall framework of a Regional Tourism Innovation System, and brings contribution at three different levels: first, it provides a model for understanding the dynamics of tourism systemic innovation, by identifying its main actors, the necessary conditions and emerging processes leading to innovation; second, this conceptual model may support empirical research on tourism and innovation; and third, it may act as a basis for the design and implementation of policies and strategies regarding innovation in tourism. This is possible once the actors to consider, the dimensions to be analysed and the resulting processes to be verified and assessed are identified.

The construct postulates that firms and non-firm organisations should operate in an innovation network. This tourism network, if working properly, will take advantage of regional conditions for innovation, benefiting each actor and the overall tourism destination. The regional innovation framework is determined by the specific characteristics of tourism territories which, in a context of a regional tourism innovation system, should contribute to the enhancement of cooperation and networks towards the development of innovation. These critical conditions are:

- The existence of natural resources which are main factors of attractiveness of tourism destinations and of the creation of new products;
- Qualified human resources endowed with the necessary skills and absorptive capacity to engage in innovation processes;
- Networks and collaborative arrangements towards innovation;
- Social capital, that is, the mutual benefits that tourism actors can obtain from being part of a network;
- A knowledge infrastructure that creates new knowledge and shares it with the elements of the entire system;
- A regional culture based on trust, collaboration and sharing that boosts collective learning;
- Institutions shaping the norms of the system and supporting innovation;
- Other industries than can act as sources of innovative ideas when transposed to tourism.

Subsequently, firms that do not innovate will, in time, benefit from the processes of knowledge creation and sharing and collective learning due to knowledge spillovers, and will increase their innovative capacity and the overall destination performance and competitiveness.

4.4 Conclusion

This chapter focuses on the regional innovation systems model and its application to tourism destinations. According to the main principles underlying this theory, the capacity to innovate depends not only on the organisations' individual performance (that result from the determinants of innovation identified in chapter 3), but how they interact with each other within the innovation system. Innovation results thus from an interactive process that is embedded in the territory and in society. Knowledge and learning create the ground for the system to operate and to evolve into

the creation of successful innovations. The main function is to develop, diffuse and use innovations.

Regional innovation systems acknowledge the importance if regional level for economic development and competitiveness. Each region is characterised by different attributes, factors, habits and traditions that shape businesses behaviour and influence the way organisations cooperate towards the development of innovation. Also, the physical proximity that is achieved fosters other types of proximity that increase the levels of trust, reciprocity and more embedded relationships, important conditions for the creation of joint innovative processes.

There is no single framework of regional innovation systems, mainly due to the uniqueness of each region in terms of actors, economic structure, institutions, resources and policies. In order to apply the RIS model to tourism, its overall framework is thoroughly analysed. Five main dimensions are identified as focal points that determine the development of tourism regional innovation systems, namely: i) its components (actors and institutions); (ii) networks, or the relationships established among them; iii) the systemic nature of tourism, alongside the systemic nature of innovation; iv) the system's boundaries; and v) knowledge and learning.

In what concerns the components, the literature review allowed defining the several types of tourism firms and non-firm organisations that should be presented in a tourism regional innovation system. The analysis of the networks focus on the different types of arrangements (formal and informal), on the fundamental concepts related to networks and innovation, such as social capital (Coleman, 1988; Putnam, 1993, 2000), structural holes and brokerage (Burt, 1982), and the strength of weak ties (Grannovetter, 1973), as well as the role of networks in tourism innovation and their main properties and measures.

The systemic perspective of tourism implies the presence of stakeholders interacting with each other within the destination (which is made of local community, institutions and economic structure), in order to create an integrated system that aims the development of regional level tourism innovations.

Regions offer the most adequate scale for the development of innovations. However, it is important to understand how they should be defined for the purpose of regional innovation

systems functioning and operations. The chapter introduces discussion on this matter namely in terms of the different criteria used to draw up the boundaries of the regions. It is found that tourism regions are mostly delimited following an administrative rationale, include a wide diversity of products and thus lack consistency, and, as a result this prevents regions from innovating. Therefore, it is proposed that tourism regions should be defined following a "product-space" approach (Costa, 2001). Bearing this in mind a definition of "region" within regional innovation systems is advanced.

Finally, the knowledge and learning dimensions are approached. There are different types of knowledge that demand distinct learning processes. Knowledge can be tacit or codified, local or global, or can be based on know-what, know-why, know-how and know-who. Despite these classifications, three processes are central for the development of innovation: knowledge creation, knowledge transfer and collective learning. Within this context, learning regions emerge as collectors and repositories of knowledge and ideas fostering regional innovation performance.

After this, it is important to understand which conditions effectively make regional innovation systems adjusted and applicable to tourism. First, tourism involves a system whose elements interact amongst themselves; it is a knowledge and information intensive industry; tourism destinations are made of integrated experiences which demands that destinations' elements operate as a whole and within networks and also demands for permanent innovative experiences that ought to attract new tourists and keep the old ones; local and regional level are the focal points of tourism policy implementation and are the places where impacts are felt; there is close interaction among tourism, territories and local communities, creating high levels of regional embeddedness of these relationships; the triple helix concept has been positively evolving in tourism, once tourism firms/ organisations, universities and the public sector are working closer towards innovation.

The conceptual model of regional tourism innovation system resulting from the study of these dimensions develops in three distinct levels: (i) the existence of **actors**, namely tourism firms and non-firm organisations engaged in networks; (ii) **conditions**, which are regional specific factors that positively influence innovative practices; and (iii) **processes** of knowledge creation, knowledge sharing and collective learning. The existence and optimal combination of these three levels will result in a successful and competitive regional tourism innovation system.

Chapter 5

Methodology

5.1 Introduction

The previous chapters present the conducted literature review consisting of concepts, theories and models considered relevant for this research. Besides being an important stock of knowledge and theoretical background, they also provide an insight into the methodological options followed in this thesis.

The first section of this chapter offers a discussion focused on epistemological issues in social sciences (section 5.2), followed by the research framework (section 5.3), in what concerns the definition of the research problem (section 5.3.1), the literature review (section 5.3.2), the theoretical framework defined by the objectives and hypothesis (section 5.3.3) and the research process, that is, the methods and techniques chosen within the empirical study (section 5.3.4). Finally, the steps regarding data analysis procedures are presented (section 5.4).

5.2 Epistemology of scientific method

When conducting scientific research, two main questions emerge that should be placed by the researcher: the methodology and methods to be used, and how to justify these choices. This justification depends on the theoretical perspective, the way one understands human knowledge in terms of what it involves and which characteristics it should have, in what kind of knowledge one believes, how should the observers of our work regard its outcomes, and so on. These are epistemological issues that are always present throughout the development of a research process. In result, the two main questions are turned into four, which relate to the basic elements of any research (Crotty, 1998):

i. What **methods** will be used?
ii. What **methodology** guides the selection and use of methods?
iii. What **theoretical perspective** lies beneath the chosen methodology?
iv. What **epistemology** informs this theoretical perspective?

The hierarchy of questions proposed by Crotty allows understanding that epistemology and the definition of epistemological issues are the basis of any scientific research. Epistemology, or the Theory of Knowledge, concerns to the nature and possibility of knowledge, that is, whether and how knowledge about reality can be obtained (O'Brien, 2006). It provides a philosophical

foundation for deciding what types of knowledge are legitimate and adequate (Maynard, 1994), and tries to understand what it means to know (Gray, 2004).

Table 5.1 – Fundamental concepts related to epistemology of science

Term	Definition
Paradigm	Set of beliefs
Ontology	Nature of reality
Epistemology	Relationship between the researcher and the subjects/ objects
Methodology	Set of guidelines for conducting research
Method	Tools for data collection and analysis

Source: Jennings (2001, p. 34)

If epistemology is the study of knowledge in a philosophical perspective, it seems important to define, under this approach, what knowledge is and how it is acquired. The *tripartite definition of knowledge* states that, in order to be qualified as knowledge, a proposition must necessarily gather three sufficient conditions: *justification, truth and belief* [14]. Knowledge is built on beliefs, but these can only be eligible as knowledge if they are true. However, one can have true beliefs "by accident", therefore, justification is also a necessary condition. Knowledge is then philosophically defined as **justified true belief** (O'Brien, 2006; Sumner, 2006)**.**

This tripartite analysis was heavily criticised by Edmund Gettier in 1963, in what became known as *The Gettier Cases*. The author argues that there are situations where beliefs may be justified and true, but not be qualified as knowledge. In response to Gettier, some theories emerged concerning epistemic justification such as *infallibilism,* postulated by Kirkham (1984) who argued that for a belief to be qualified as knowledge, it must not only be true and justified, but also the justification must be infallible (the justification of the belief must necessitate its truth). Alvin Goldman contributed significantly to the field of the justification theory with the concept of *reliabilism*. The author argued that a belief can only be classified as knowledge if it is produced by a reliable process: "*Rules for forming beliefs should promote the formation of true beliefs*" (Goldman, 1986, p. 84).

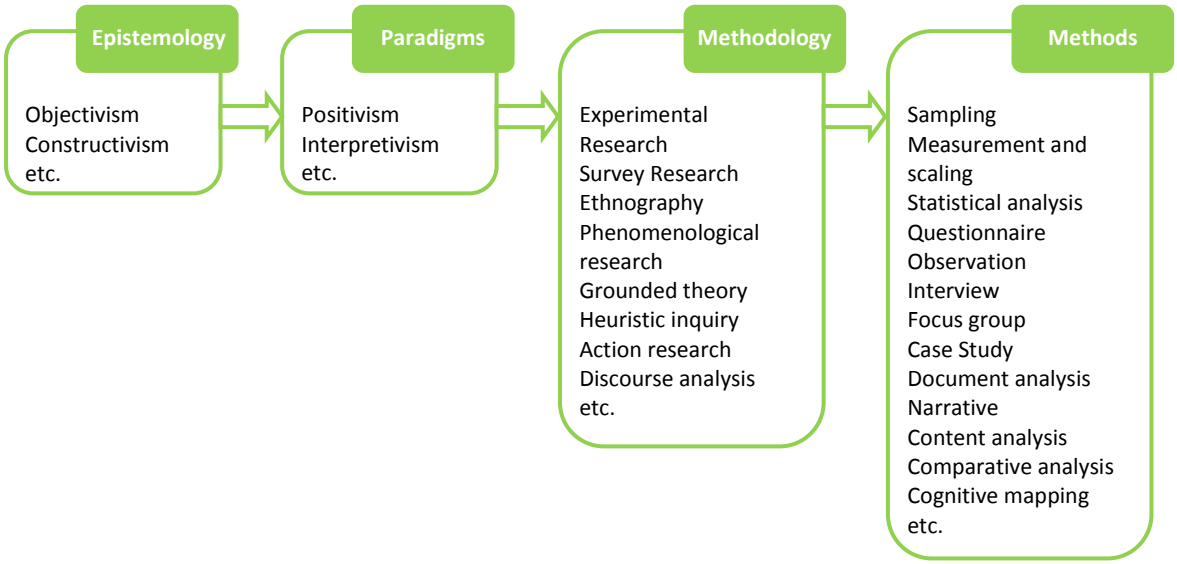
[14] The roots of this approach can be found in Plato, namely in Theaetetus dialogue (201 c-d).

Another justification theory is *foundationalism*, considered by many as the beginning of the discussion of justification of beliefs (Dancy, 2001). Foundationalists consider that justification occurs in inferential terms, i.e., beliefs are justified by being inferred from other justified belief. This attaches a problem: for every belief there must be at least another justified belief and so on, leading to an infinite regress of justified beliefs (Regress Problem). Foundationalism counter-argues this problem by assuming the existence of epistemological foundations, beliefs that do not need justification, or non-inferentially justified because are self-justifying (Dancy, 2001; O'Brien, 2006). Conversely, *coherentism* rejects the assumption of the existence of foundational beliefs. Instead, it suggests that entire systems of beliefs are justified by their coherence, that is, a belief is justified if and only it belongs to a coherent system of beliefs, which depends on its consistency, cohesiveness and comprehensiveness (Audi, 2003; Goldman, 1986).

These appear to be the most relevant (or basic) epistemological issues concerning the problematic of knowledge. However, the way knowledge is acquired is of foremost importance. There is an evident interrelationship between the researchers' epistemological view, the theoretical perspective, and the selected methodology and methods (Crotty, 1998; Gray, 2004; Sumner, 2006). Epistemology helps to define the overall architecture of the research process, to pinpoint important issues related to its design and to the type of data collection, analysis and interpretation.

Within social sciences, two main epistemological views stand out: **objectivism** and **constructivism**, offering different views and understandings of the world and knowledge (Figure 5.1). Objectivism has been the dominant epistemology in the Western culture, although constructivism also exists, but clearly to a lesser extent. While objectivist epistemology holds that meaning and reality exist independently of consciousness, that is, reality exists no matter it was already discovered or if anyone is conscious of the phenomenon, constructivism refutes this assumption. For constructivists, there is no objective truth because meaning depends on the mind, which is the same to say that meaning is constructed (and not discovered) by subjects in their own different ways and depend on their interactions with the world (Crotty, 1998; Gray, 2004; Meinert, Pardeck, & Kreuger, 2000).

Figure 5.1 – Relationship between Epistemology, Theoretical Perspectives, Methodology and Research Methods



Source: adapted from Crotty (1998, p. 5)

Table 5.2 provides a useful synthesis of the main principles underlying theses two converse epistemologies.

Table 5.2 – Objectivist versus Constructivist Epistemologies

Objectivism	Constructivism
▪ Reality exists independent of the person ▪ Absolute truth can be uncovered ▪ Knowledge consists of verifiable facts ▪ Meaning resides externally to symbols ▪ Knowledge results from categorizing concepts ▪ Science is the core method for discovering truth ▪ Causality can be discovered ▪ Individual behaviour is determinate and can be understood	▪ Reality is constructed by the person ▪ Truth is relative to time and place ▪ Knowledge is a social construct ▪ Meaning is a result of social interaction ▪ Knowing is an ongoing process of interpretation of events ▪ Science is an interpretive process unique to each observer ▪ Causality is a complex process involving numerous elements ▪ Individual behaviour is determinate

Source: Meinert et al. (2000, p. 46)

5.2.1 Paradigms in social sciences

As shown in figure 5.1, epistemological theories are related to research paradigms, which are theoretical perspectives that inspire and guide a given science (Corbetta, 2003). The concept of paradigm is strongly related to Thomas Kuhn's approach patent in his seminal work *The Structure of Scientific Revolutions* (Kuhn, 1996, 1962). Traditionally, sciences were seen as cumulative; knowledge was constructed in a linear progression of new acquisitions, in a continuous process of additions to the former body of knowledge. However, at some point, revolutionary moments may occur, this continuity is disrupted and a new construction process begins – a scientific revolution takes place within a discipline of thought, a displacement of the network of concepts in which scientists rely and according to which they see the world occurs. This conceptual network is what Kuhn calls a **paradigm**. Paradigms are then theoretical perspectives that define the relevance of social phenomena, put forward interpretative hypothesis and direct the techniques of empirical research.

Paradigms guide scientific research: they provide a solid basis for the interpretation of problems, development of hypothesis, choice of methodology procedures and techniques. They provide guidance concerning which direction scientists should take in order to fulfil their research process. However, an important question arises: Kuhn developed the concept of paradigm in order to distinguish social sciences from natural sciences, so, can one talk about paradigms in social sciences? Or are they, as Kuhn (1996, 1962) argued, characteristic of mature (natural) sciences? As social sciences lack a single paradigm accepted by the entire scientific community, the author argues that they are in a pre-paradigmatic stage. However, Friedrichs (1970, cit in Corbetta, 2003) proposes a different interpretation. By excluding from the concept of paradigm the need for consensus and acceptance from the members of scientific community, he concludes that multiple paradigms may co-exist in a given discipline. Under this theory, social sciences are *multi-paradigmatic*, instead of pre-paradigmatic.

Positivism and interpretivism are considered to be the "*founding paradigms of social research*", from which the first procedures emerged and guided the development of empirical research (Corbetta, 2003, p. 12). As it will be seen, positivism is linked to objectivism and interpretivism is associated to constructivism. For the former, there is an objective reality that can be discovered through research, while for the later, truth is created by the interaction between subjects and the

world (instead of being discovered), so subjects construct their own meaning in distinct ways (Gray, 2004).

The paradigm of **positivism** can be traced back to the work of August Comte (1798-1857) in the beginning of the nineteenth century, the time of the *Enlightenment* and of *Scientific Revolution*, which aimed that science could be used for human progress. French philosophers considered at the time that science should be the tool to reconstruct society according to more human and just guidelines. The works of Sir Francis Bacon, Montesquieu and Turgot, were highly inspiring for Comte, who slowly started to recognise science as a means for human progress. This was the beginning of sociological positivism (Turner, 2003). It is interesting to consider Comte's view on the development of society and science (Comte, 1876), in order to better understand the foundations of positivist paradigm. According to his *Law of Three Stages*, they develop through the following stages:

i. Theological or fictitious stage: Once man can't explain the causes of events, they are attributed to God, to imaginary or divine forces;

ii. Metaphysical or abstract stage: It is an improvement of the previous stage. An abstract power or force determines and explains the occurrence of events. This thinking rejects the belief in a concrete divinity.

iii. Positive or scientific stage: Events are explained scientifically and rationally, based on scientific methods such as experiments, observation, and comparison. There is a search for the "how" of things, instead of "why".

Positivism advocates then the "*study of social reality utilizing the conceptual framework, the techniques of observation and measurement, the instruments of mathematical analysis, and the procedures of inference of the natural sciences*" (Corbetta, 2003, p. 13). Within this paradigm, the reality can be subject to scientific study in the same way as natural sciences, as the world is guided by scientific rules that explain the behaviour of phenomena through causal relationships (Jennings, 2001; Veal, 1997). Positivists believe that all true knowledge is scientific, all things are measurable, science is universal and scientific method is unique (Bullock & Trembley, 1999; Corbetta, 2003).

Alongside the work of Comte, which popularised the positivist thinking, is it important to highlight the contributions of Emile Durkheim. Considered to be the first social scientist, he transposed the

positivist principles to effective empirical procedures based on "social facts". For him, sociological method should "*consider social facts as things"*, being social facts ways of acting, thinking and feeling that exist outside the consciousness of the individuals and functioning independently of the use that individuals make of them (Durkheim, 1895, p. 60).

Some important assumptions are on the basis of positivist paradigm (Corbetta, 2003; Giddens, 1993; Gray, 2004):

- **i.** Social reality exists outside the individual;
- **ii.** All knowledge can be expressed in terms which refer to an immediate way to reality;
- **iii.** Social reality is objectively understandable and consists of what is available to senses (facts);
- **iv.** Natural and human sciences share common logics and methodological principles, and therefore can be studied using the same methods;
- **v.** Research should be based on empirical enquiry and scientific observation;

Dualism and objectivity are two important characteristics of positivism that underlie the construction of knowledge within this paradigm. Dualism means that the researcher and the subject are independent entities, and objectivity implies that the researcher has no influence on the subjects, on the results or on the findings. Results are thus reliable and able to be reproduced by other scholars (Jennings, 2001; Weber, 2004). Positivism is also inductive, meaning that results and conclusions are moved from the particular to the general. Generalisations derive from empirical results registered in the proportion of reality that was studied (Corbetta, 2003; Gray, 2004).

The *interpretive* paradigm is, therefore, linked to the constructivist epistemology. With its roots in the beginning of the twentieth century, it is based on the work of Max Weber and his concept of *verstehen*, which means comprehension. The interpretivism's underlying assumption derives from the criticisms to Comte's positivism made by the German philosopher Wilhelm Dilthey in 1883. His argument, adopted by Weber, advocates that natural and social sciences are nothing alike due to the relationship established between the researcher and the reality. In natural sciences, the reality is external to the researcher and so knowledge is created by the explanation of facts. Conversely, in social sciences researchers cannot be detached from the phenomena under

analysis, which means that knowledge can only be obtained through a process of understanding (*verstehen*) (Corbetta, 2003; Gray, 2004).

Interpretivist researchers believe that the world is made of multiple realities, as they rely on the people being studied to provide their individual explanation of phenomena. Reality is understood under the interpretations of social actors, and meanings arise from the process of social interaction, which will obviously vary according to each subject's point of view. There is a close link between the researcher and the subject, as the first should be part of the social setting and become a social actor himself. This relation is subjective because the researcher is expected to see the world under the individuals' perspective. The world, reality or social phenomena are subjective and socially constructed (Barron, 2006; Easterby-Smith, Thorpe, & Lowe, 1991; Gray, 2004; Jennings, 2001; Veal, 1997).

However, the close relation between researcher and subject is not seen as a negative process, constituting instead the basis of the related cognitive process. Unlike positivism, social research is defined as an interpretive science in search of meaning, and not an experimental science in search of law - induction vs. deduction (Corbetta, 2003).

The differences in ontology and epistemology that frame both paradigms will obviously require different (and even opposite) methodologies and research techniques (Table 5.3). Positivist theoretical underpinnings assume the application of specific research methods conducive to an objective approach, able to be replicable by other researchers. Surveys and questionnaires are typically the preferred instruments, as they can be easily applied to other contexts. The use of inductive procedures and mathematical formulations are the two main features of positivist methods. Methods and instruments are founded on the control of the defined variables, which can be operacionalised and quantifiable. Questionnaires and similar methods allow the maintenance of objectivity when the distance between researcher and subject is attained. Methodologies are quantitative, focused on measurement and testing of hypothesis. Although neo-positivist approaches include some qualitative analysis, it is characterised for a more reduced fieldwork involvement (Bryman, 1984; Corbetta, 2003).

By opposition, interpretivism's techniques are qualitative and subjective, with significant variance among different cases depending on the nature and type of interaction established between the

researcher and the subjects. This hampers the replication of the used methods and techniques. These are qualitative in nature, and focus on language rather than on numbers and on participants' understandings of social world. Interpretivist researchers use methods such as heuristic inquiry, phenomenological research, or grounded theory, which provide inductive approaches (Gray, 2004; Hewson, 2006).

Table 5.3 – Differences between Positivism and Interpretivism paradigms

Metatheoretical assumptions about	Positivism	Interpretivism
Ontology	Researcher and reality are separate.	Researcher and reality are inseparable.
Epistemology	Objective reality exists beyond the human mind. Science is value-free.	Knowledge of the world is intentionally constructed through a person's lived experience. Science is driven by human interests.
Research Object	Has inherent qualities that exist independently of the researcher.	Is interpreted in light of meaning structure of researcher's lived experience.
Methods	Quantitative methods. Statistics, content analysis. Operationalise concepts that can be measured. Using large samples to generalize to the population.	Qualitative methods. Hermeneutics, phenomenology. Use of small samples researched in dept over time.
Researchers should	Focus on facts. Causality between variables. Formulation and test of hypothesis (deduction).	Focus on meanings. Understand what is happening. Construction of theories and models from data (induction).
Theory of truth	Correspondence theory of truth: one-to-one mapping between research statements and reality.	Truth as intentional fulfillment: interpretations of research object match lived experience of object.
Validity	Certainty: data truly measures reality.	Defensible knowledge claims.
Reliability	Replicability: research results can be reproduced.	Interpretive awareness: researchers recognize and address implications of their subjectivity.

Source: adapted from Weber (2004) and Easterby-Smith et al. (1991)

Tribe (1997) groups tourism research into two distinct categories: (i) economic and business oriented and (ii) concerned with cultural and social issues. The first approach may be included in the positivist paradigm, as it relies mainly on quantitative methods in order to find the causality between variables and the formulation and test of hypothesis. The later is mostly developed through qualitative methods that aim at understanding occurrences and designing theories and models from the collected information.

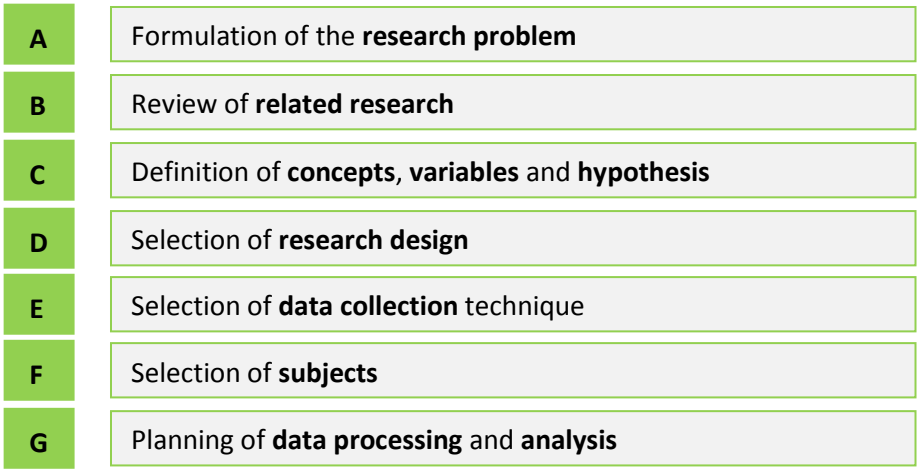
Despite the acknowledgement that both paradigms bring extreme value and provide solid ground basis for different types of research, the present study adopts a positivist approach because it is experimental, adopts quantitative methods and statistical tests with the objective of finding relationships of causality between variables and of validating previously identified hypothesis. It relies on a process of deduction that allows generalising the findings to the population due to the use of a large sample. It is thus possible to replicate the research and its results.

After explaining the difference between research paradigms and why this research adopts a positivist framework, it is important to draw attention to the way the research process can be developed and the one applied to this thesis. The following section brings insights on this matter.

5.3 The research framework

Corbetta (2003, p. 57) defines research as a "*creative process of discovery which is developed according to a pre-established itinerary and according to predetermined procedures that have been consolidated within the scientific community*". Despite the fact that there is no single agreement on the process of scientific research, it is acknowledged that it develops in a sequence of phases. According to Pizam (1994), the typical structure and process of planning a scientific research should assume seven sequential stages, as depicted in figure 5.2.

Figure 5.2 – Seven steps of scientific research

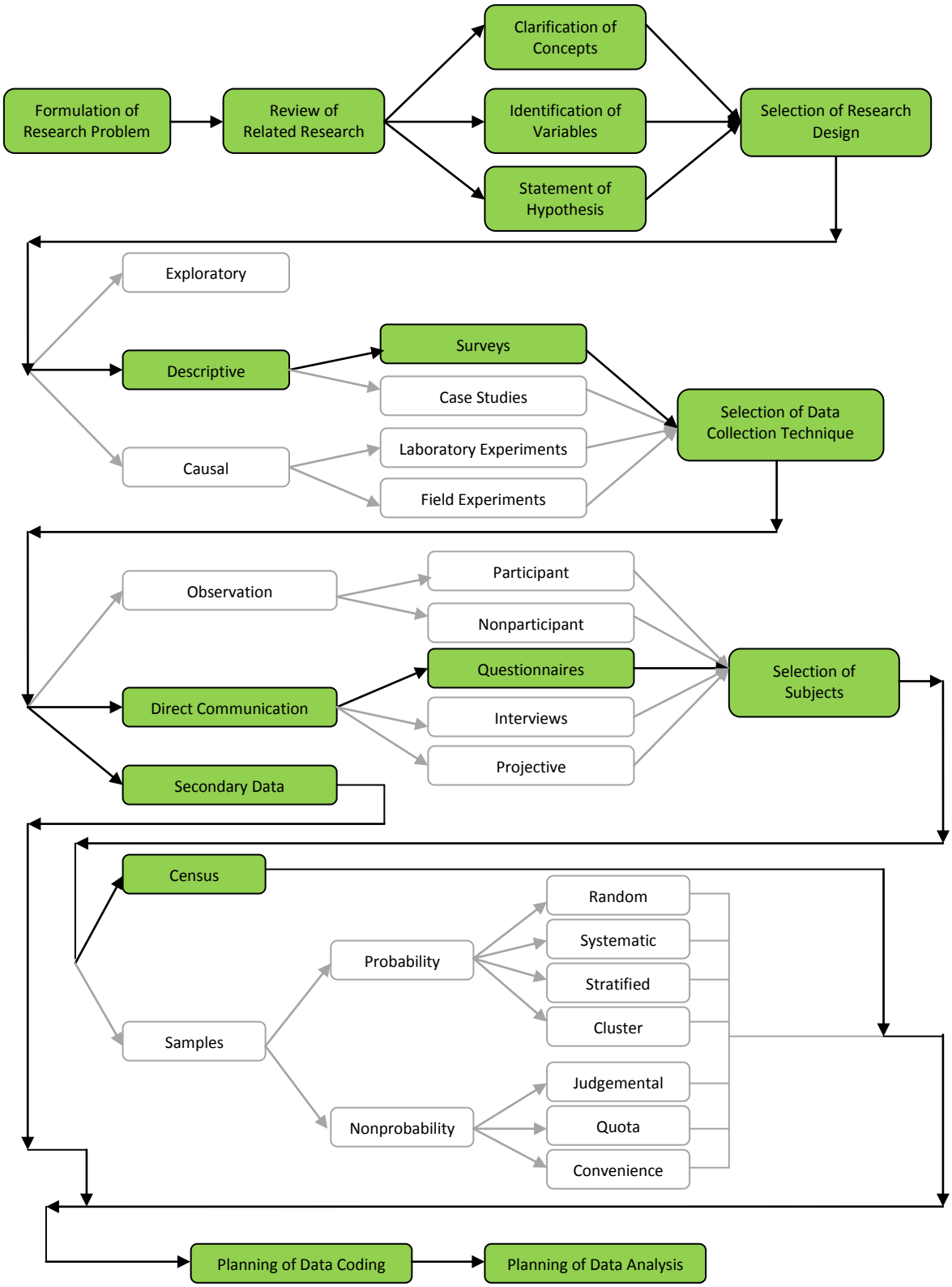


Source: adapted from Pizam (1994)

One issue that seems to be widely recognised is the fact that a research process begins with theory and returns to theory, in a loop (Corbetta, 2003; Hill & Hill, 2000). That is, the research begins with the selection of a research problem and is followed by the review of the existent theories and literature on that topic. In result of this analysis, the research should create the hypothesis (deduction), which will be subsequently tested according to the adequate methods and applied to the selected subjects. The analysis and interpretation of data aims at summarising it in a manner that it answers to the research questions (Pizam, 1994). Finally, the researcher returns to the initial stage, the theory. In a process of induction, the empirical results are compared with the hypothesis and with the initial theory, which will be confirmed or reformulated.

Figure 5.3 presents the research process that was adopted when developing this thesis. The steps followed are explained in detail in the following sections.

Figure 5.3 – Steps of Tourism Research Process



Source: Pizam (1994, p. 92)

5.3.1 The research problem

According to Pizam (1994), in a scientific research context, the formulation of the problem is much more essential than its solution.

The research problem should result from the collection of information through an exploratory research based on literature and discussion with specialists with knowledge on the matter (Dencker, 1998). It is a scientific problem that can be investigated; an interrogation that asks about the relation between two variables. Researchers can only move forward in the research if the research problem and objectives are clearly identified and defined. The formulation of the research problem should consider that the study should contribute to tourism knowledge creation, should have value for practitioners and scientists and should be original (Pizam, 1994).

The research problem emerged from a comprehensive exploratory literature review which allowed to define the importance of this work for tourism research and to establish a set of conceptual basis supporting both the research question and the used methodology. The areas over which the literature review was made are explained in section 5.3.2.

Bearing these considerations in mind, the research problem is defined as the following:

Do regional innovation systems play a critical role in improving tourism performance, increase competitiveness and prevent destinations from declining?

5.3.2 Literature review: fields of study and objectives

Literature review is the process of identifying previously done research on the topic under study and doing a systematic and comprehensive analysis of them. As tourism is a recent field of study and is also multidisciplinary I nature, it is paramount to thoroughly analyse the existent body of knowledge (Veal, 1997). A new research is always based on prior works and provides a basis for future studies. Researchers that build their studies on previously done research have a better

chance of contributing to knowledge, that is, the scientific contribution is higher when the researcher can establish links with other studies or theories (Pizam, 1994).

Veal (1997) attributes important roles to literature review, namely: (i) being the basis of research; (ii) it is the source of ideas on topics for research (exploratory); (iii) provides information on research already done by others; (iv) it may be a source of theoretical and methodological ideas; (v) it may act as a basis of comparison; and (vi) it may help to find information that is a supportive part of the research. Pizam (1994) highlights the fact that it allows the establishment of a theoretical base out of which the research problem is formulated and the hypotheses are developed.

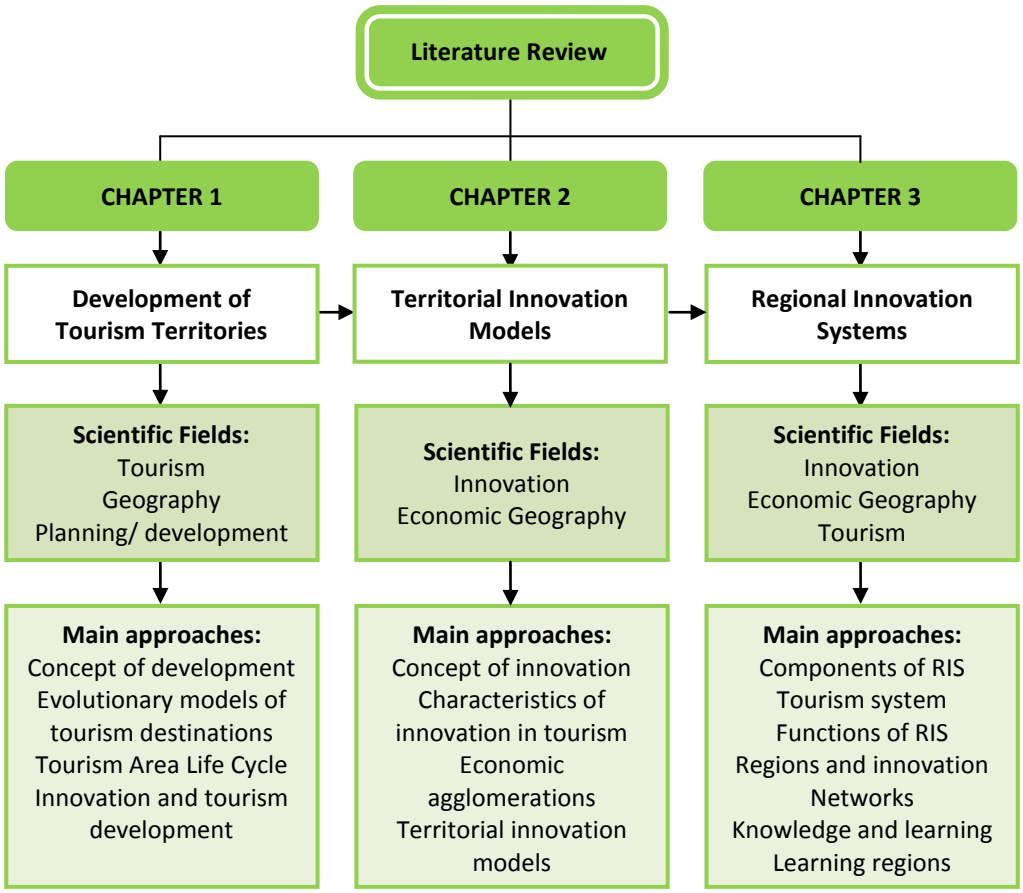
The literature review undertaken in this work was carefully planned according to the research objectives and is globally related to three main fields of analysis (Figures 5.4 and 5.5):

Figure 5.4 – Literature review: main topics of analysis

Source: own construction

The findings drawn from the review on these three topics were crucial to find the main gaps in the literature and to develop the research question and hypothesis, as well as to provide important insights on methodological issues and on the empirical research design, especially if one considers the lack of quantitative studies on tourism and regional innovation systems.

Figure 5.5 – Framework of literature review



Source: own construction

5.3.3 Theoretical framework: objectives and hypothesis

The theoretical or conceptual framework involves concepts and expresses how the researcher views the concepts involved in a study, namely the relationships between them (Veal, 1997).

This model is expressed in terms of hypothesis. Subsequent to the survey and analysis of the theory, and based on the findings drawn out of it, the objectives and hypothesis were developed, through a process of deduction. Hypothesis should be designed over the following criteria: (i) they must be propositions that imply a relationship between two or more concepts; (ii) they should comprise a lower level of abstraction and generality than theory; and (iii) they should enable theory to be transformed into terms that can be empirically tested, that is, they are derived from the theory, but still lack empirical validation (Corbetta, 2003).

Table 5.4 – Relationship between Objectives, Hypothesis and Survey Questions

Objectives and Hypothesis	Survey Questions
Objective 1: To characterise the patterns of tourism innovation at destination level, in terms of performance, type, activities and sources of innovation	
H_1: The types of tourism innovation vary according to the region and the destinations' stage of development.	QI.1/ QI.1.1/ QIV.2
H_2: The economic significance of innovation varies across tourism regions and their development stage.	QI.3/ QI.4
H_3: Innovation activities differ across tourism regions and destinations' stage of development.	QI.5
Objective 2: Networks **2a) To evaluate the characteristics of the relationships established within RTIS that are on the basis of destination level innovation across regions.** **2b) - To evaluate the characteristics of the structure and of the relationships established between tourism institutions within RTIS that are on the basis of destination level innovation.**	
H_4: The structure (components) of Regional Tourism Innovation Systems change across tourism regions.	QI.2/ QII.1/ QII.2/ QII.6 SNA: nr. of nodes and ties, density, average degree, network centralisation, type of actors, geographical location of actors.
H_5: The types of relationships developed towards innovation within RTIS change according to the tourism region.	QII.3/ QII.4/QII.5 Social Network Analysis: purpose of cooperation (links)
H_6: Regional tourism destinations' innovative performance is higher when there are strong innovation networks within RTIS, based on diverse and strong patterns of collaboration among tourism actors within the network and links with outside partners (small-world networks).	QII.2/ QII.3/ QIII.3/ QV.1/ QV.2/ QV.9 SNA: E-I Index, clustering coefficient, small-world coefficient
H_7: Destination management organisations or public organisations performing destination management functions are the most prominent in tourism innovation networks.	SNA: actors' centrality
Objective 3: Embeddedness – To determine the importance of the region and of regional specific factors for tourism innovation.	
H_8: Regional specific factors play a significant role in supporting the development of innovation by tourism firms.	QIV.1/ QIV.2/ QV.3
Objective 4: Knowledge – To determine the importance of localised knowledge for tourism destinations' innovation.	
H_9: Tacit knowledge plays a more important role for tourism destinations' innovation than codified knowledge.	QIII.2
H_{10}: Local knowledge plays a more significant role for tourism destinations' innovation than outside knowledge.	QIII.1/ QIII.3/ QV.4/ QV.5
Objective 5: To evaluate how Regional Tourism Innovation Systems influence destination level innovation as tourism destinations evolve.	
H_{11}: Regional Tourism Innovation System may help to prevent destinations from declining and boost their rejuvenation (during stagnation stage and promote redevelopment or adjustment of destination).	QV.7/QV.8
H_{12}: As tourism destinations evolve, organisations feel an increased need for developing joint innovations/strengthening innovation networks within Innovations Systems.	QV.6/ QII.3/ QIII.3

Bearing these considerations in mind, and according to the contribution of literature review, table 5.4 presents the objectives and hypothesis of this thesis and the relationship between them and the designed survey.

5.3.4 Research process: used methods and techniques

Subsequent to the definition of the theoretical model, that is, the objectives and hypothesis, the empirical research model and the data collection techniques should be selected accordingly. As mentioned in section 5.3.2, there are methodologies and methods suited to the paradigm that characterises each research. Considering the dominant paradigm, the researcher should first define the approaches to the research based on information requirements and on the methodology used, in order to subsequently design the research process selecting the proper methods and techniques. While Jennings (2001) considers seven different approaches based on information requirements[15], which are not mutually exclusive, Pizam (1994) groups them in three main groups (exploratory, descriptive and causal). In what concerns the methodology, it can be qualified as qualitative and quantitative.

Descriptive studies are used when the objective is the systematic description of facts and characteristics of a specific universe or field of interest. They aim at (i) describing the characteristics of specific groups; (ii) estimating the proportion of individuals that behave in a certain way; (iii) finding relationships and interactions between variables; (iv) providing a vast quantity of information that allows to construct experimental models in order to determine causality. These types of studies are not limited to a specific data collection technique. They are widely used in tourism research due to the fact that research problems in this scientific field are not subject to experimental techniques (Pizam, 1994).

Once the present work is grounded in the positivist paradigm, it should adopt quantitative methods applied to concepts that can actually be measured, using a sufficient large sample that allows generalising to the entire population and should comprise a process of deduction through the testing of hypothesis. Figure 5.1 presents several methodologies and methods related either to quantitative or qualitative methods, or to positivist or interpretivist approaches.

[15] Exploratory, descriptive, explanatory, causal, comparative, evaluative, predictive.

Considering the defined objectives and hypothesis, this descriptive research process sets on quantitative methods based on surveys. Quantitative studies assume that data should be numerical, which enables the transformation of complex information in a synthetic and understandable way. They are objective and transparent in regard to the used procedures. This way, data can easily be analysed and/or reproduced by other researchers or an alternative interpretation can emerge (Veal, 1997).

Pizam (1994) defines three means of collecting data: observation, direct communication with subjects and secondary data. Due to the objectives of this thesis, two data collection techniques were used: secondary data and direct communication by means of questionnaire-survey.

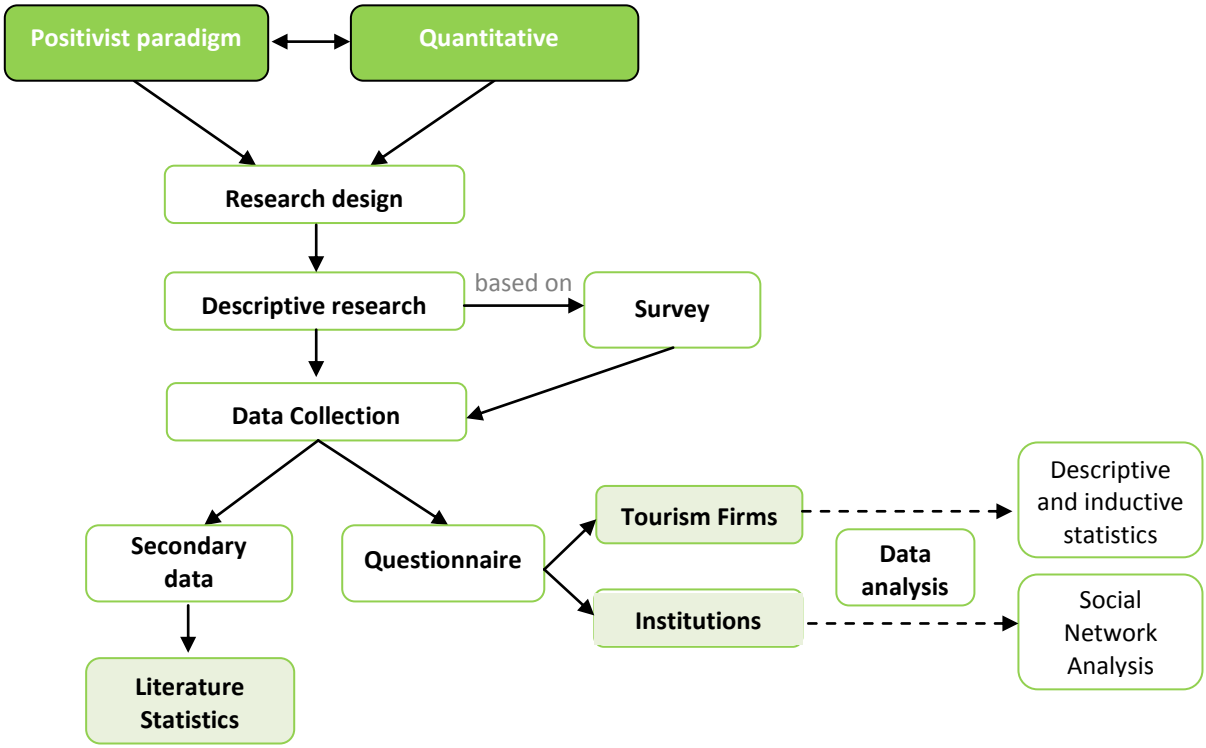
There are different techniques for data collection. The selection of the appropriate method is of foremost importance in the research process, reason why there should be a thorough knowledge on their characteristics, advantages, disadvantages and limitations. Dencker (1998, p. 132) believes that choosing the data collection technique should consider the following criteria:

- It should result from the research problem, the objectives and the availability of resources;
- Different techniques are not mutually exclusive; one may use in the same research project distinct methods, according to the variable in analysis and the stage of the research;
- It is advisable to begin the research with an exploratory study, in order to study the state of the art in the research topic, which will facilitate the decision on which methods to use in subsequent stages.

Two distinct but complementary empirical studies were conducted in this thesis: the first has the main objective of studying regional innovation systems in tourism according to the perspective of tourism firms, which are the main agents of innovation; the second intends to characterise the regional institutional networks supporting tourism innovation and the overall innovation performance of tourism destinations. The lack of quantitative studies on tourism and regional innovation systems and also on networks within regional innovation systems lead one to engage in a comprehensive review of previous empirical research on innovation system, applied mainly to other industries and business activities, as well as to study the range of measures that exist on social network analysis and that can bring important evidence and conclusions on networks and

innovation. Secondary data proved to be fundamental in this context. This analysis, presented in sections 5.3.4.1 and 5.3.4.2 provided important inputs for the design of the surveys, the selection of subjects and the data collection and processing.

Figure 5.6 – Adopted research process



Source: own construction

Secondary information was obtained through previously published related research collected from libraries, on-line libraries and from full-text databases such as B-On, ISI Web of Knowledge, Scopus, Emerald, Springer, CABI, EBSCO, etc. Literature review and referencing was made with the use of the *Endnote X5* software, which helps to search, collect, organise, reference and cite all the reviewed bibliography. An electronic *Endnote* library was constructed by the researcher for this study, organised by themes, chapters and sections, with a total of about 2000 records (although not all of them were included in the thesis), including books, book chapters, journal articles, websites, reports, thesis, statistical data, conference papers, conference proceedings, thesis and other scientific studies. The statistical data regarding tourism was collected from the yearbooks of the Portuguese National Statistics Institute (INE – *Instituto Nacional de Estatística*) and the data

regarding innovation was collected from the European Union Community Innovation Survey, applied in Portugal by the Office of Planning, Strategy, Evaluation and International Relations - Ministry of Finance (GPEARI - *Gabinete de Planeamento, Estratégia, Avaliação e Relações Internacionais, Ministério das Finanças*).

5.3.4.1 Regional innovation systems research

As previously mentioned, there is a lack of methodologies and quantitative studies on the relation of tourism and regional innovation systems. For this reason, it is fundamental to overlook the existent empirical studies, in order to build on the methodologies already validated and to create one to be specifically applied to tourism.

At some point, Breschi and Malerba's sectoral systems of innovation were considered as a model of analysis. This was developed on the assumption that the organisation of innovative activities, the rate and type of innovation and the used technologies are significantly different across business sectors (Breschi & Malerba, 1997). However, understanding tourism as a sectoral innovation system may not be the most adequate, considering that different tourism firms operate with distinct knowledge bases, do not use particular technologies and inputs, have distinct demands and may have dissimilar objectives and behaviour (Sundbo et al., 2007).

The first writings on innovation systems are dated from the beginning of 1990s, and were reviewed in chapter 3. These were mainly conceptual, establishing an overall framework for its components, dynamics, functions and geographical levels. Relevant empirical studies and methodologies emerged later, and are mainly applied to industrial settings. An important milestone on the evolution of innovation systems research was the editing of the Oslo Manual by the OECD and the European Commission, which provided the guidelines for the collection and interpretation of data on innovation since 1992. This favoured the development and implementation of the Community Innovation Survey (CIS) in firms located in member-states, as well as the Regional Innovation Scoreboard (with regional data from CIS made available by the different countries). Several academic studies on regional innovation systems use data from these publications.

The methods used to study systemic innovation evolved in the last decade. The most relevant studies in terms of methodologies and results are subsequent to the year 2000, while the conceptual support is prior to this period. In fact, quantitative studies that directly address firms and organisations are more recent.

Considering the objectives and the quantitative nature of this thesis, some of the most relevant empirical studies on regional innovation systems were selected and reviewed. A synthesis of this analysis is presented in appendix 2. The review focused on the objectives, hypothesis, variables and the corresponding design of the data collection technique. Besides the studies that resort to data from the Community Innovation Survey, questionnaires and interviews are the most frequently used tools. These studies are mainly quantitative or combine both quantitative and qualitative techniques in a triangulation of methods.

Only two relevant studies on tourism and regional innovation systems were found both based on qualitative methods. Despite the fact that the scope of this analysis was on quantitative approaches, the application to tourism industry helped to narrow the focus of the research process and to identify important dimensions of analysis.

This review was of leading importance in providing contributions and inputs to the design of the research process, especially in what concerns the type of questions, variables, scales, sample, response rate, data analysis procedures, organisation of the questionnaire and main constraints faced by the researchers.

5.3.4.2 Social network analysis

In chapters 3 and 4, it was possible to conclude that the establishment of relationships among regional economic agents and organisations is the most basic condition for the development of systemic innovation. It is simultaneously an input and an output of regional innovation systems. Several studies, some of them presented in table 5.5, analyse these relationships in terms of macro-environment within a specific industry (especially those based on data from the Community Innovation Survey (CIS) and from Regional Innovation Scoreboard). Others account for the number and purpose of links established within a regional innovation system, classifying

the actors according to a mainstream chain-of-value. The application of social network analysis to distinct dimensions of tourism destination management from various actors has been proving to be a powerful methodology in analysing relationships among actors. Moreover, it was also concluded that innovation networks should function as the operating parts of regional innovation systems and that they bring significant advantages to the development of innovation within tourism systems. Hence, it was selected as the most suited method to analyse the relational dynamics of regional tourism innovation.

Social Network Analysis presents a distinct research perspective within social sciences. It differs from traditional methods of analysis in social and behavioural science. The conventional approaches (mainly used in economics and psychology) focus on individual attributes or on the relations between them in order to explain certain phenomena. Individuals are depicted as making choices and acting with no influence from the behaviour of other actors. These individual perspectives ignore the social context in which actors are embedded. On the contrary, social network analysis considers that individual features arise from relational properties of a social structure. That is, relationships among actors are central in explaining their nature, behaviour and outputs. There are two fundamental assumptions that should be pointed out: first, any actor is involved in a social system in which many other actors participate; second, it also considers the inner-organisation of the social system, with regard to its components, positions and roles (structural properties), which influences the nature and type of existing ties and reveals dynamics that do not exist at nodal level (Knoke & Kuklinski, 1982; Wasserman & Faust, 1994).

Social network studies analyse “whole-networks” and “egocentric” designs. Whole-network analysis refers to a set of related actors that are considered as a social collective. Egocentric is focused on a single actor (*ego*) and on the actors to which he is linked to, directly or indirectly (*alters*). Despite this distinction (which is useful in determining the level of analysis and the measures to apply), these two dimensions are strongly interrelated, as for a whole-network, there is an ego network for each of the actors that compose it (Marsden, 2005).

Social networks may be represented in two ways. The matrix form of representation is called a sociomatrix, or a *one-mode* data set because it refers to a single set of objects. The actors are positioned in rows and columns in the same exact order, and data is inserted in order to present: the existence (1) or absence (0) of ties among them, through binary data; or the strength of ties,

case in which different values are attributed to the relation. The other way of representing a network is by the use of a sociogram. In this case, the relationships among actors are represented graphically with dots (actors) and lines (ties between actors). *Two-mode networks* consider two sets of objects/ relationships, namely the measurement of relationships at multiple occasions (e.g.: which actors belong to which associations) (Wasserman & Faust, 1994).

The application of the theory and method of social network analysis has grown significantly in recent years[16]. Two main factors may have been contributing to it: (i) an increasing tendency to a system-level analysis in most sciences (for instance, Leiper presented the first systemic and comprehensive approach of tourism industry in 1979, followed by several others[17]); and (ii) a simultaneous improvement in data collection, storage, management and analysis (Kolaczyk, 2009).

The use of quantitative analysis of networks is also recent in innovation research. Initial work in this area approaches the structure of business networks. More recent studies are linking structural characteristics of networks and actors position and role to innovation performance. The literature review leads to the conclusion that there is a strong link between regional innovation and the nature, structure and strength of ties in a network (see chapter 4, section 4.2.5).

Social network analysis has been evolving, as academics come forward with graph-theoretic properties that characterise network structures (at network level), network positions (node level) and dyadic properties (Borgatti et al., 2009). "*The structure of relations among actors and the location of individual actors in the network have important behavioral, perceptual, and attitudinal consequences both for the individual units and for the system as a whole"* (Knoke & Kuklinski, 1982, p. 13).

The analysis of the actors' position within a network provides valuable information. Depending on the nature and type of linkages, it informs on situations of power, prestige, influence or access to resources. There are several ways of analysing positional data. The most widely used is ***centrality***, i.e., the extent to which a node is in the centre of the network, in the sense of structural importance or prominence. The study of actors' centrality brings important information for network analysis as it allows understanding who has more access to resources, who is in the

[16] For a detailed review on the evolution of Social Network Analysis, see chapter 4, section 4.2.5.
[17] The systemic perspective of tourism industry is presented in chapter 4, section 4.2.2.

position of transferring knowledge more effectively, who is more and less dependent on network structure, and who has higher levels of influence and network control. Usually, central actors are in an advantageous position. The higher the number of ties, the higher is the access to resources, knowledge, learning opportunities, brokerage situations from which they can benefit and lesser the dependency on (a few) other actors. Centrality means power.

Freeman (1979) suggests three centrality measures that complement each other and provide a deeper level of analysis: ***degree***, ***betweenness*** and ***closeness*** (Freeman, 1979). While these measures analyse centrality in function of the direct linkages of a node, ***Bonacich's Centrality*** proposes an additional understanding on centrality dynamics, as it considers the centrality of an actor's adjacent nodes to assess its own centrality (Bonacich, 1987).

Degree centrality refers to the number of direct ties that an actor has with others in the network. It represents the extent to which an actor participates in the network and is directly proportional to the probability of accessing resources (Granovetter, 1973). Actors with high degrees (sum of their direct nodes), are the most visible in the network, present more relational activity, have more available alternatives to connect to other actors being less dependent on a single actor and usually is an individual/ organisation with a higher status (e.g.: a leader). He accesses more information, faster and more reliable (Degenne & Forse, 1999; Wasserman & Faust, 1994). He might occupy, therefore, an important position as the receiver of new knowledge and in its diffusion throughout the network, performing a significant role in the development of innovations. Conversely, actors with low degree are peripheral and somehow inactive in the relational process, as they are completely isolated (Wasserman & Faust, 1994). However, one should be cautious when conducting this type of analysis, as a peripheral node might have his own network and occupy a brokerage role, which places him in a privileged position.

It is important however to note that too many ties may be time and resource consuming, and thus may limit the possibility of making new connections and gathering new knowledge that contributes to innovation. This situation may lead to lock-in effect.

Other perspective on centrality may be captured through the control that an actor has over the flow of resources and on whom others are highly dependent. Within this context, the power brought by centrality would lie on an individual that bridges nodes that otherwise would not be

linked together. This is ***betweenness*** centrality. An actor with high betweenness is strategically located on the paths linking pairs of others. This person can influence the entire network by controlling the flow of resources and communication, which may, for instance, be withheld or distorted (Freeman, 1979).

Closeness is the sum of the distance of an actor to all other actors in the network. Taking Freemans's approach, it is calculated by the sum of the lengths of the shortest paths from an actor to all other actor (which makes it, actually, a measure of farness). High closeness is considered a precondition for the emergence of trust among network members, which is an important innovation mechanism as it fosters joint knowledge creation, transfer and the development of networked innovation. It also increases the sharing of tacit knowledge, and faster responses to market turbulence (Uzzi, 1997). The higher the degree of closeness of an actor, the more innovative he may be, as he conveys high-quality knowledge from other actors. However, too much closure may be detrimental in fostering lock-in and therefore hampering innovation.

Centrality measures are applied at nodal/ individual level, as they inform on the position of actors, namely in what regards to power and prominence within the broad network structure. At the network level, ***cohesion*** and ***structure*** (or shape) are the two properties to consider (Borgatti et al., 2009). Cohesion indicates the extent to which actors and the overall structure is linked and it can be characterised by measures such as *density*, *diameter*, *flow*, *point connectivity*, among others.

Cohesion also refers to the definition of sub-groups, i.e., sub-sets of actors among which there are stronger, direct and intense connections. These actors are more connected among themselves than with the other nodes in the network, presenting higher density, shorter paths, and higher connectivity. Through this analysis, it is possible to conclude on the ability for collective learning, innovation, knowledge sharing, and possibility of access to funding, etc. Within this context, it is relevant to measure ***cluster coefficient*** (degree to which nodes cluster together), ***cluster analysis/ hierarchical clustering*** (method in which nodes that are most similar in their profile of distances to all other points are joined into a cluster), the analysis of *components* (sub-graph where all nodes must be reachable through one or more paths, but have no connections outside the sub-group) and the identification of ***cliques***. Broadly speaking, cliques are sub-groups of actors that present high local density, being these actors more closely tied to each other than to other

network members The definition used in SNA is narrower and considers it as a maximally and fully complete sub-graph, where all nodes are adjacent to all other nodes (path length equal to one). As this mathematical concept is very restrictive for real world networks, some extensions to the notion of clique exist. In an ***n-clique***, *n* is the maximum path length at which nodes are considered to be connected, which is much closer to real network behaviour. Thus, a *2-clique* is a sub-graph where all nodes are connected directly or at a maximum length of two, through a common neighbour. Additionally, researchers may prefer to identify ***n-clans***, a concept similar to *n-clique*, but that introduces a restriction, by forcing all ties to occur through members of the n-clique. This later approach may result in long and stringy groups as it is possible for members to be connected by non-member nodes (Hanneman & Riddle, 2005; Koput, 2010; Scott, 2000).

Once sub-groups are identified, researchers ought to analyse if they bring cohesion or fragmentation to the network. This can be done by examining if cliques overlap, which nodes are affiliated to different cliques and what role do they play, if there are there similarities among the clique's members, what is the innovative performance of each clique and how the sub-groups connect to each other.

The structure of the network is closely related to the existing level and type of cohesion and linkages. According to the topology, four network models that mimic real world networks can be found in literature (Figure 5.7): regular, random, scale-free and small-world networks (Barabási & Albert, 1999; Erdos & Renyi, 1959; Newman, 2003; Watts & Strogatz, 1998):

- ***Regular networks*** are non-random and highly ordered structures where each node connects to its neighbours and all nodes have the same number of links.
- ***Random networks*** are the opposite, as the links between nodes occur randomly and thus each pair has an equal probability to be linked. It is homogeneous and highly disordered.
- ***Scale-free networks*** emerge in the context of new nodes entering the network and connecting preferentially with more highly connected networks. They are characterised by power law distribution. There are a few nodes with a high number of links (hubs), and most nodes have few links. These hubs contribute significantly for connectivity. In scale-free networks' uneven topology, the hubs polarise power and resources and, as they combine local clustering with global connectivity, knowledge transfer is fostered.
- ***Small-world networks*** combine (i) high clustering with (ii) low average path length. In these network structures, the majority of nodes can be reached from other nodes by a

small number of links (Watts & Strogatz, 1998). This results in non-hierarchical, bottom-up relationships and communication channels (Kastelle & Steen, 2010).

In result of these specific features, **small-world networks** have a significant impact on firm and regional innovation. High clustering and small paths create an efficient structure where knowledge, information, experiences and resources flow better and there is a higher possibility for connecting skills and ideas and for collective learning, enhancing innovation. High clustering creates transmission capacity in a network, as it enables rich and large quantities of information and knowledge to be rapidly diffused, while reach (short path length) ensures the rapid access to a wide and diverse variety of information sources and with less risk of distortion (Giuliani & Pietrobelli, 2011; Kastelle & Steen, 2010; Schilling & Phelps, 2007; Steen, MacAuley, & Kastelle, 2010).

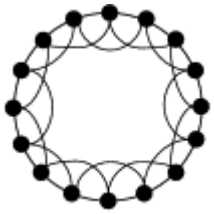
Networks are associated with a geographical dimension, as nodes have a specific position in space, and geographical proximity assumes a primary role in determining the relationships between actors. The small-world model starts from this assumption by building a network on a regular lattice and then adding or moving edges to create a low density of shortcuts that join remote parts of the ring to one another (Newman, 2003) , as represented in figure 5.7, a) and d).

In small-worlds, there is a significant level of local trust and an environment fruitful for cooperation and consensus. It is also usual that local cliques do not remain isolated, as some members are usually connected to actors that are distant, to members of other cliques or to even other networks (Baum, Shipilov, & Rowley, 2003; Watts, 2004). However, excessively dense clusters can be harmful for innovation: available information and knowledge can become redundant and homogeneous due to the presence of many redundant paths to the same actors. The diversity of knowledge diffused in clusters provides the necessary variety and diversity, which are requisites for innovation. Clusters offer firms local and global advantages: firms benefit from redundant and dense local links as they rapidly access to deep knowledge; they also benefit from being part of a larger network because they access information from nodes that are connected to other networks and thus bring new, diverse knowledge (Schilling & Phelps, 2007). This reflects the combination of local social capital and Burt's structural holes, which appear to be the most suitable combination for a high innovation performance.

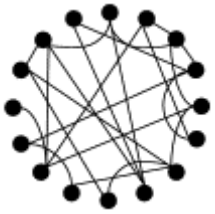
The correlation between small-world networks and innovation output was positively confirmed by several authors. For instance, by Uzzi and Spiro (2005) in their empirical study of small-worlds in the Broadway musical industry, Schilling and Phelps (2007) obtained the same results while analysing the patent performance of eleven industry-level alliance networks, and Verspagen and Duysters (2004) found that networks of strategic technology alliances presented the features of small worlds, with significant favourable implications for knowledge transfer and innovation.

Figure 5.7 – Regular, Random, Scale-Free and Small-World Network models

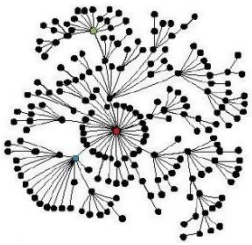
a) Regular Network (lattice)



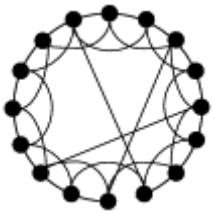
b) Random Network



c) Scale-Free Network



d) Small-World Network



Source: M'Chirgui (2012); Watts and Strogatz (1998:441)

Small-world networks can be quantitatively identified. The metric developed by Watts and Strogatz (1998) quantifies the properties of small-world networks through their characteristic path length (*L*) and clustering coefficient (*C*), where *L* measures the typical separation between two nodes (global property) and *C* measures the cliquishness of a typical neighbourhood (local property). Clustering and path length are then compared to the same measures of an equivalent random network with the same number of nodes and links, i.e., *C* and *L* are measured against C_{rand} and L_{rand} to obtain the ratios $C_{ratio}=C/C_{rand}$ and $L_{ratio}=L/L_{rand}$. Small-world Coefficient is obtained by dividing C_{ratio} by L_{ratio}:

$$SWQ = \frac{C/C_{rand}}{L/L_{rand}} = \frac{C_{ratio}}{L_{ratio}}$$

Networks are considered to be Small-world structures when the **Small World Quotient is higher than 1**, presenting thus high levels of clustering and short average path length.

Finally, an important level of network analysis concerns the ***structural roles and positions***. In what concerns innovation, it is fundamental to study the existent structural holes and to identify the nodes that act as brokers. The structural holes theory was developed by Burt (1992) and was extensively discussed in chapter 4. The concept is related to social capital, and to the positional advantages that individuals can obtain from the existing network structure, namely by filling the structural holes (case in which they act as brokers). A structural hole refers to the absence of ties between nodes, in a way that they cannot directly exchange resources, information, knowledge, ideas, or they may even be unaware of each other. In such a situation, the actor that links two non-connected nodes (the broker) will be in an advantageous position, namely in what concerns to innovation-related benefits. Organisations that act as brokers access to more diverse knowledge, which promotes creativity and the development of innovations. They are also in a privileged position to identify opportunities and to access the necessary resources to rapidly respond to threats. Brokers can also exert significant control on which information and knowledge flows and among which actors (Ahuja, 2000; Burt, 1992; Hanneman & Riddle, 2005). Burt (1997) also suggests that maintaining too many ties is costly and inefficient, so it is important to identify redundant ties and eliminate them in order to increase the efficiency of the network.

Structural holes are analysed in the context of ego networks, as they refer to specific positions within the whole network. As previously mentioned, whole and ego networks are highly related in terms of analysis. Burt has developed some measures that relate to structural holes and that allow a better understanding of the phenomenon within social structures (Borgatti, Everett, & Freeman, 2002; Borgatti et al., 2009; Burt, 1992; Hanneman & Riddle, 2005):

- *Dyadic redundancy*: for each ego it gives the extent to which each of its alters are tied to all of ego's other alters (i.e., the extent to which the alter is redundant). The larger the proportion of others who are tied to an alter, the more redundant is ego's direct ties.
- *Dyadic constraint*: gives the extent to which the relationship between ego and each of the alters constrains him. For instance, an ego A is constrained by the relationship with an alter B when A does not have many alternatives (that is, has few other ties beyond the one with B) and all A's other alternatives are also tied to B. Then, B is constraining A's behaviour.
- *Effective size*: number of alters that each ego has, minus the average number of ties that each alter has to other alters.
- *Efficiency*: measures what proportion of ego's ties to its alters is non-redundant. It informs if the investment of time and resources in alters is being well spent.
- *Constraint*: measures the extent to which ego's connections are to others who are connected to another. It points out that actors who have many ties to others may eventually loose freedom of action: if an ego's potential trading partners all have one another as potential trading partners, the ego is highly constrained. From this measure, one may conclude a network's eventual lock in effect.
- *Hierarchy*: measures the degree of distribution of constraint in a network, indicating the extent to which the constraint on ego is concentrated in a single alter. If the total constraint on ego is concentrated on a single alter, hierarchy will present a higher value. If the results are more equally distributed by multiple actors, hierarchy will be lower. It provides understanding on the dependency within an ego's network, through the inequality in the distribution of constraints.

Within structural positions, it is extremely relevant to identify actors performing ***brokerage*** roles. This perspective emerges from the concept of social capital proposed by Burt (1992) and relates to the benefits that individual networks can retrieve from occupying specific strategic positions within the overall network structure. Brokers fill in structural holes, and thereby connect two or more nodes, components or networks. For this reason, they are placed in a privileged position to access large amounts of varied knowledge and information, resources, to identify new opportunities, to develop new ideas and innovation. They also control the flow of resources and may decide who has access to which knowledge and information.

Besides these, there are numerous ways to analyse networks and consequently, diverse measures, statistical and mathematical formulae. The way in which researchers analyse social structures will obviously depend on the nature and objectives of their work. Despite this, when examining the related literature, it was possible to define which measures are most widely used and, simultaneously, those which can contribute to the understanding of innovation networks within regional tourism innovation systems. The selected and presented measures, as well as their impact on innovation, are summarised in table 5.5.

Table 5.5 – Network properties, measures and implications for innovation

Network		Definition	Implications for Innovation
Properties	**Measures**		
Centrality Prestige Prominence	Degree (Freeman)	Number of direct ties of a node (possibly weighted by the strength of tie).	Access to information, knowledge, resources in general. The more people a node has connections to, the greater the chance of one has the resource needed.
	Betweenness (Freeman)	Degree to which an actor is able to connect with others that would otherwise be disconnected. It is the extent to which an actor lies on the geodesic paths between other pairs of actors in the network. 'Who is in the middle'.	An actor is in a favoured position when he falls on the geodesic paths between other pairs of actors in the network. High betweenness means gatekeeping, influence, dependence, control, brokerage, access to nonredundant information, higher innovation potential. The actor is not constrained by group rules. If there are few actors with high betweenness, the network may be easily disrupted. Actors with high betweenness link together others that would otherwise be unconnected.
	Closeness (Freeman)	Sum of geodesic paths of one node to other nodes in the network. Indicates how close the actor is of all other actors.	Higher efficiency, as it has access to other actors in a minimal number of steps, information is received faster. Independence of brokers, may avoid control by other actors.
	Group Degree/ Network Centralisation	Expresses the degree of inequality or variance in a network as a percentage of that of a perfect star network of the same size. It records the extent to which a single actor has high centrality, and the others, low centrality.	Relative measure useful for comparing different structures. When network centralisation is high, there are few central and prominent actors, the power is unequally distributed.
Connectivity Cohesion Shape	Density (Sparseness)	Number of direct ties between nodes in relation to the maximum possible number of ties. Useful alternative to degree centrality which, being an absolute measure makes comparison between different networks impossible.	In high density networks, there are higher levels of trust, knowledge flows more easily which fosters knowledge transfer and collective learning leading to innovation. However, if all alters of a node are connected to each other, they are redundant, which increases relational energy that could be placed in making new fruitful connections. Excessive density with no external linkages can lead to network lock-in.
	Reachability	The degree any member of a network can reach other members of the network. An actor is reachable by another if there is a set of connections/ edges between them, regardless of how many nodes fall in this path.	If some actors cannot reach others, there is the potential for a division of the network or it may indicate that the group is composed by more than one sub-populations. A node that is reachable by all other has higher innovative potential, as he has access to knowledge from different sources and can combine it in innovative ways.

Network		Definition	Implications for Innovation
Properties	Measures		
	Diameter	Quantifies the higher distance between two nodes, that is, the largest geodesic distance in the connected network.	The lower the diameter, the higher is the efficiency of information and knowledge sharing.
	Geodesic distance	Number of relations in the shortest possible walk from one actor to another.	Geodesic path is often the "optimal" or most "efficient" connection between two actors. If a network has many small geodesic distances, knowledge travels quickly.
	Maximum Flow	Number of different actors in the neighbourhood of a source that lead to pathways to a target.	The connection between two nodes is stronger, as the number of alternatives to reach each other is higher.
	Point Connectivity	Number of nodes that would have to be removed in order for one actor to no longer be able to reach another.	High connectivity means less dependency, less vulnerability and access to more resources from different actors.
	Clustering Coefficient	The clustering coefficient of an actor is the density of its open neighbourhood. The overall clustering coefficient is the mean of the clustering coefficient of all the actors in the network.	When clustering is high, actors are more close to each other, relationships are more embedded, knowledge flows faster, there may be a higher level of trust and of resource sharing, the potential for collective learning and innovation rises. The network is robust and less vulnerable to nodes that exit the network in order to maintain the connectivity.
	External-Internal Index (E-I Index)	Measures the group embedding based on the comparison of the numbers of ties within groups and between groups. It is the ratio between external and internal ties.	A balance between internal ties (strong ties, dense network) and external ties is the optimal structure for innovation, as it brings external knowledge and allows it to quickly spread within the regional network.
	Cliques	Groups of at least three actors that are all connected to each other. Actors in the same clique are more closely tied to each other than they are to other network members (high local density). It is a maximal fully-connected sub-graph, all nodes are adjacent.	Cooperative environment, high trust, sharing of resources, lack of hierarchies, high knowledge flow, increased innovation potential due to the strength of ties.
	N-Cliques	Cliques with n ties among members. For instance, a 2-clique is a clique where members are connected by a path length of 2 or less.	
	N-Clans	Similar to n-cliques, but connections must be made by clique members and not by outsiders.	
	Small World Q (SWQ)	Quantifies the relationship between clustering coefficient (CC) and average path length (PL). First, it is calculated the clustering coefficient ratio and path length ratio, dividing real CC by the CC of an equivalent random network. The same is done for path length. To obtain SWQ, CC ratio is divided by PL ratio. When the result is higher than 1, we are facing a small-world network.	Small world networks combine high clustering with low average path length. This results in a structure characterised by trust and cooperation where knowledge, information and resources flow easily, enhancing collective learning and innovation.

Network		Definition		Implications for Innovation
Properties	**Measures**			
Structural Roles and Positions	Structural Holes	Static holes (absence of ties between actors) that can be strategically filled by connecting one or more links. Nodes that occupy these positions are usually brokers and have high betweenness centrality. The concept is related to social capital. Related measures are **dyadic redundancy**, **dyadic constraint**, **effective size**, **efficiency**, **constraint** and **hierarchy**.		Actors that link different networks or sub-groups have access to a great diversity of knowledge enhancing the exploitation of new ideas and promoting innovation. Actors with access to structural holes experience more creativity, efficiency and innovative potential, have more access to resources (such as knowledge) and are able to better identify and respond to threats and opportunities. They are able to control the actors that they connect to. Brokers usually have a privileged position in the network, as they have more power than other nodes.
	Brokerage	Coordinator	Connects actors from the same group as himself.	
		Consulting	Mediates a relation between two members of the same group, but is not itself a member of that group	
		Gatekeeper	Member of a group who is at its boundary, and controls access of outsiders to the group.	
		Representative	Controls access of his group to outside actors.	
		Liaison	Mediates the relation between two groups, and is not part of either.	
	Efficiency	Measures what proportion of a node's ties to its neighbourhood is "non-redundant". Efficiency tells us if time and energy invested in contacts are well spent, i.e., there is small benefit in making a new contact redundant with existing contacts.		In efficient networks, nodes can access instantly to diverse sources of knowledge or power through a small number of ties. Networks with more non-redundant contacts provide more benefits.

Source: own elaboration based on Bonacich (1987); Borgatti, Jones, and Everett (1998); Borgatti et al. (2002); Borgatti et al. (2009); Burt (1992); Freeman (1979); Hanneman and Riddle (2005); Scott (2000); Wasserman and Faust (1994); Watts and Strogatz (1998)

5.3.4.3 Tourism firms' survey design

In any research, the selected methods and techniques should be constructed in a way that effectively allows testing the formulated hypothesis and answer the research problem. Thus, the methods should be carefully designed, including questions that are verifiable and allow controlling the findings of the study (Deshaies, 1997).

In this research, considering the objectives and research question, the first selected method was the survey by questionnaire. A survey is a "*technique of gathering information by questioning those individuals who are the object of the research, belonging to a representative sample, through a standardised questioning procedure with the aim of studying relationships among variables"* (Corbetta, 2003, p. 117). In questionnaires, questions and answers are standardised.

Within descriptive studies, the questionnaire survey is the most common used method. Pizam (1994), Veal (1997) and (Jennings, 2001) refer its main advantages:

- Flexibility in choosing the data collection techniques, such as mail questionnaires, interviews, phone interviews, etc.;
- Provides important and useful quantified information for a large number of people and organisations;
- Possibility of generalisation to the whole population and to similar populations;
- Reduced cost per subject or unit of analysis;
- The procedures are transparent and thus the process can be reproduced by other researchers;
- Ability to collect large quantities of information;
- Accuracy of results;
- Tourism encompasses a wide range of activities with different characteristics, and questionnaires are a good mean of gathering the necessary information in a homogeneous way;
- Can offer anonymity and confidentiality when necessary;
- Remove interviewer bias when the interviewer is not physically present;
- When is self-completed, the participant can complete the questionnaire at his own pace.

However, some disadvantages are also pointed out, namely the fact that results are supported by respondents' information, which will always depend on their ability to remember, their honesty and, especially, of the format of the questions included in the questionnaire. Some authors also suggest that respondents are frequently affected by the desire to be useful and friendly and thus may exaggerate the participation levels (Veal, 1997). Other disadvantages may relate to low penetration, time-consuming and no control over individual responses due to misunderstanding (Pizam, 1994).

In order to design a successful questionnaire, it is necessary to identify the model to adopt, especially in what relates to the type of questions, the measurement of variables and the decision if the questionnaire is completed by the interviewer or by the respondent. All these issues should be faced with the objectives and hypothesis of the study.

The first step was to decide if the questionnaire was to be composed of closed or open-ended questions. Open-ended questions demand an answer that has to be constructed by the respondent, while closed questions present a set of alternatives provided by the researcher, out of which the individuals should select one or more options. These typologies present the following advantages and disadvantages:

Table 5.6 – Advantages and disadvantages of closed and open-ended questions

Type of question	Advantages	Disadvantages
Open-ended questions	May provide more information. May provide richer and more detailed information. Sometimes, they give unexpected information.	Frequently, the answers have to be interpreted. Answers must be codified, which is very time consuming. It is usual to use at least two researchers in interpreting and coding the answers. Answers are more difficult to analyse with more sophisticated statistics and the analyses requires a lot of time.
Closed questions	It is easy to apply statistical tests to analyse the answers It is frequently possible to analyse data in a sophisticated way.	Sometimes, the information is not very rich. Sometimes, the answers lead to too much simple conclusions.

Source: Hill and Hill (2000, p. 94)

Hill and Hill (2000) argue that closed questions are useful when the researcher knows well the nature of the variables under research and wants to gather quantitative information on them,

which is applied to this empirical study, considering that a substantial previous research was conducted. Another relevant matter is that the questions demand some level of knowledge regarding innovation practices and activities. Therefore, it was decided to design the questionnaire on the basis of closed questions. On the other, hand the inclusion of open questions would eventually appeal to higher levels of knowledge that the respondents might not have, a risk reduced by the employment of this technique. However, the option "Do not know/ Not answering" was included in every questions.

Table 5.7 – Types of scales used in the questionnaire

Type of scale	Application in the questionnaire
Itemised	▪ Types of innovation developed; ▪ Innovation level (new to the firm or to the market); ▪ Innovation activities developed by firms; ▪ Engagement in networks; ▪ Identification of organisations with which there has been cooperation; ▪ Territorial scope of organisations with which there has been cooperation; ▪ Identification of purposes of cooperation; ▪ Origin of human resources; ▪ Most important knowledge sources for regional tourism innovation; ▪ Identification of which actors usually introduce innovation in tourism.
Likert	▪ Frequency of contact with organisations with which there has been cooperation; ▪ Importance of different types of organisations for regional tourism innovation; ▪ Importance of regional specific factors for tourism innovation; ▪ Agreement or disagreement with a group of statements.
Ratio	▪ Rate of innovations developed in cooperation; ▪ Rate of sales that result from innovation; ▪ Rate of sales that result from innovation developed in cooperation.

Source: own construction

Once the questions were defined, it was necessary to consider the several possibilities of measuring the variables of the closed questions. The two types of scales more frequently used in questionnaires are the nominal and ordinal (both categorical). The former rely on a set of different and mutually exclusive qualitative categories (e.g. Yes/No; Male/Female). Ordinal variables assume a numerical classification of the items, establishing a relation of order among them. In this type of variables, the respondent should attribute a value or degree of importance to the provided options. The main objective is to measure their attitudes or opinions. Beyond these, there are also quantitative variables that can be divided in interval/continuous (when is not

restricted to particular values) or ratio. Ordinal variables may be measured according to different scales, such as itemised, hierarchical, bogadus, thurstone, likert, multidimensional scaling, differential semantic scale, etc. (Hill & Hill, 2000). The firms' questionnaire included itemised, likert and ratio scales. Their application is presented in table 5.7.

Another important decision had to be made: if the questionnaire was going to be completed by the researcher or by the respondent. There are clear advantages and disadvantages in both methods, as referred in table 5.8. When the questionnaire is completed by the interviewer, the process is more expensive, it takes more time, but provides more complete and precise answers. On the contrary, when the respondents complete the questionnaire, costs and time are reduced, but response rates are usually lower, whether due to difficulties in understanding the questions, or because the individuals chose not to answer, which may also bias the results (Veal, 1997).

Table 5.8 – Interviewer versus respondent completion

	Interviewer completion	Respondent completion
Advantages	More accuracy Higher response rates Fuller and more complete answers Design can be less "user-friendly"	Cheaper Quicker Relatively anonymous
Disadvantages	Higher cost Less anonymity	Patchy response Incomplete response Risk of frivolous response More care needed in design

Source: Veal (1997:149)

Due to the dimension of the target population, it was decided that the questionnaire should be completed by the respondents. The fact that the target subjects are managers of the tourism firms is a factor that could help to overcome the lack of knowledge and the difficulties in interpreting questions. Furthermore, the topic of innovation in tourism and networks is of high interest to managers and entrepreneurs, which should motivate them to answer to the questionnaire. In result, the questions had to be clearly formulated and some instructions were included in order to facilitate the interpretation, reducing the chances of misunderstanding and the non-response rate. Considering the diversity of tourism firms to be surveyed, there was also an extended concern so that the questionnaire could be applied to all of them.

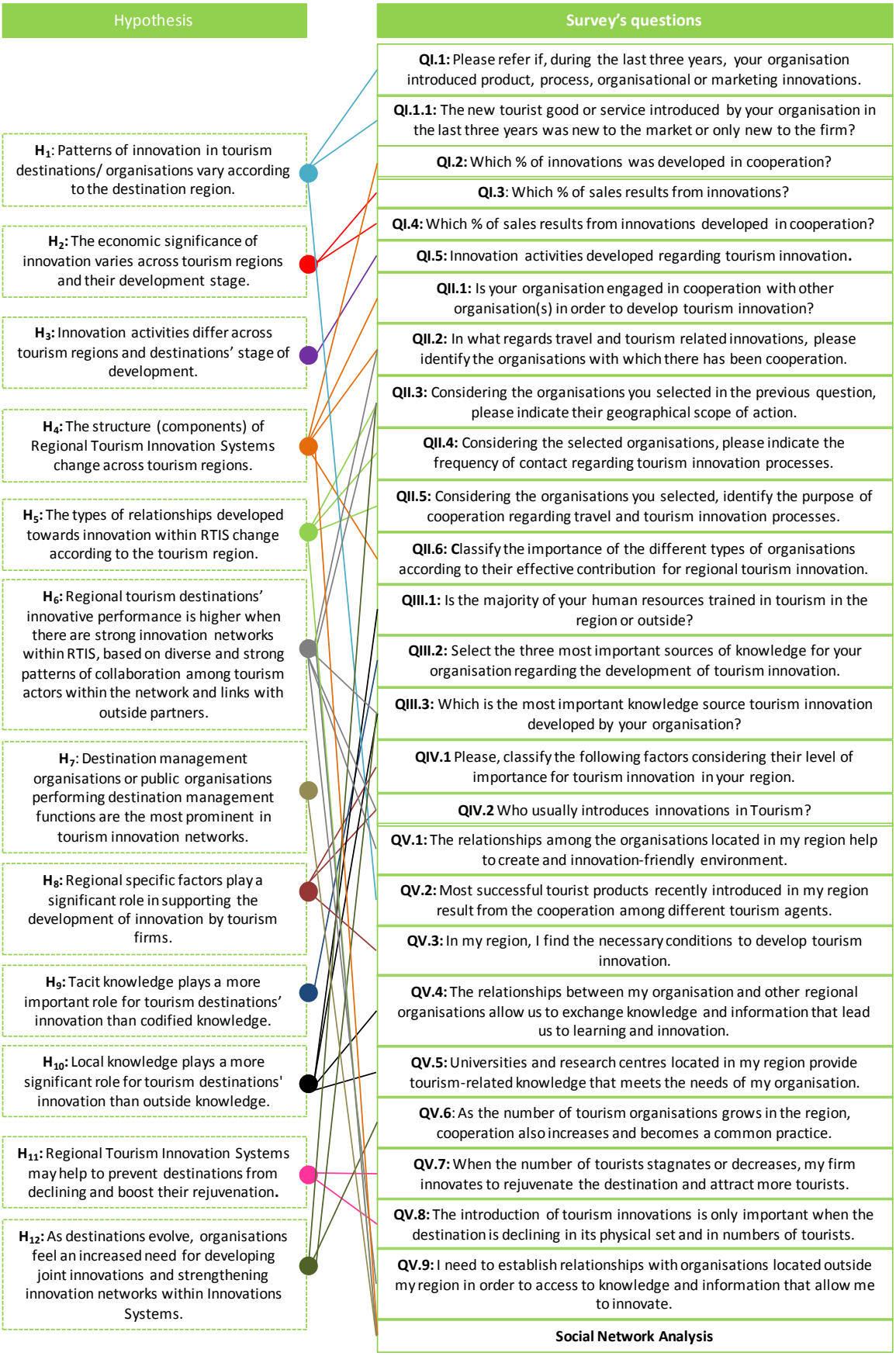
Table 5.9 – Questionnaire sections, questions, data collected and expected results

Question	Data collected	Expected results
PART I – INNOVATION AND INNOVATION ACTIVITIES		
QI.1	Types of innovations developed; identify innovative and non-innovative firms; characterise innovation intensity.	The main objective of this section is to characterise the tourism firms and to compare both regions in terms of innovation performance.
QI.1.1	Determine if the product is new to the market or only new to the firm; determine the level of innovativeness.	
QI.2	Rate of innovations developed in cooperation.	
QI.3	Rate of sales resulting from innovations.	
QI.4	Rate of sales resulting from innovations developed in cooperation.	
QI.5	Which innovation activities are undertaken.	
PART II – NETWORKS AND COOPERATION TOWARDS INNOVATION		
QII.1	Number of firms engaged in networks of innovation.	The aim is to identify the patterns of innovation networks within RIS; to identify which type of firms by tourism sub-sector most contribute to tourism innovation.
QII.2	Type of organisations involved in cooperation for tourism innovation.	
QII.3	Geographical scope of firms in cooperation; Embeddedness of regional innovation; Internal and external links.	
QII.4	Frequency of contact among the involved organisations.	
QII.5	Purpose of cooperation.	
QII.6	Importance of different types of organisations for regional tourism innovation.	
PART III – REGIONAL KNOWLEDGE INFRASTRUCTURE		
QIII.1	Origin of human resources; Embeddedness of human capital.	To identify the conditions in terms of knowledge infrastructure and sources; the role played by regional knowledge in tourism innovation.
QIII.2	Most important sources of knowledge for tourism innovation; Importance of tacit and codified knowledge.	
QIII.3	Importance of sources of knowledge for tourism innovation: geographical and sectoral dynamics.	
PART IV – IMPORTANCE OF REGION'S SPECIFIC FACTORS FOR INNOVATION		
QIV.1	Classify the importance of regional factors regarding their effective contribution for tourism innovation.	To determine the importance of specific and unique factors for innovation.
QIV.2	Identify which type of actors usually introduces innovation in tourism in the region.	
PART V – STATEMENTS		
QV.1	The impact of the relationships between organisations in innovation environment.	This section has a two-fold purpose: to obtain the perception of regional firms regarding tourism innovation, validating previously answers; and to understand the role of innovation in the development of both tourism destinations.
QV.2	Do successful tourism products result from cooperation?	
QV.3	If the region provides the necessary conditions to innovate.	
QV.4	If networks contribute to knowledge exchange, learning and innovation.	
QV.5	Role of universities and research centres in tourism innovation.	
QV.6	Relation between tourism development and increasing cooperation.	
QV.7	Relation between destination decline and innovation development.	
QV.8	Perception on the most important timing for the development of tourism innovations.	
QV.9	Importance of relations with external organisations for innovation.	
PART VI – GENERAL INFORMATION		
QVI.1	Name of organisation	To characterise the surveyed firms in terms of their overall conditions. These are the independent variables.
QVI.2	Location (municipality)	
QVI.3	Number of employees	
QVI.4	Type of tourism firm (main activity)	
QVI.5	Age of organisation	
QVI.6	Education level of staff	
QVI.7	Staff with background in tourism	

The order of the sections and the design of the questions were carefully planned to obtain rigorous and useful information. The topics and questions result from the comprehensive conceptual findings from the literature review and from previously validated empirical studies on regional innovation systems. The guidelines provided by the Oslo Manual (OECD, 2005) proved to be extremely useful, as well as the questions of the Community Innovation Survey, that were used as the basis for the construction of the Part I of the questionnaire, with the necessary adaptations to tourism industry. In total, it comprised 26 questions, plus 8 regarding the general information of the firms (appendix 5).

To sum up, the methodology used for the design of the questionnaire is directly related to the research problem, the study objectives and allows validating the defined hypothesis. It is tried, through the formulated questions, to collect data that lead to insights and conclusions on the framework and dynamics of regional innovation systems in tourism and all the processes and practices that underlie this model. The final objective is to identify a framework that increases the attractiveness and competitiveness of regional tourism destinations. In result, during the process of the questionnaire design, there was a great concern that all the questions are closely related to the hypothesis, as depicted in figure 5.8.

Figure 5.8 – Relation between hypothesis and survey questions



5.3.4.4 Institutions survey design

As previously mentioned, two complementary empirical studies were developed in order to fulfil the objectives of this research. Beyond the questionnaire applied to tourism firms, it was decided to apply an interview-questionnaire to tourism institutions operating at regional level located in Douro and in Aveiro. Considering that the relationships established among the organisations are the core of regional innovation systems, the main objective of this survey was to obtain relational data that allow characterising the institutional tourism innovation networks and identifying the institutional support that these networks provide to the overall innovation performance of tourism destinations.

As concluded by Costa (1996) when conducting his research on tourism networks, the interview-questionnaire proved to be more powerful than questionnaires when the objective is to obtain relational data, which is the case of the present study. Thus, an interview-questionnaire was designed following two criteria: (i) the questions were formulated with the goal of the collecting relational data that allow applying the metrics of social network analysis; (ii) considering the profile of the respondents (top managers, presidents of institutions), the instrument had to be simple enough to be fully completed in a short period of time.

The information needed from these individuals was not complex. They had to (i) specifically identify organisations or institutions with which they were cooperating or have had cooperated in the last three years within tourism innovation processes; (ii) their territorial scope of cooperation; and (iii) to classify the purpose of cooperation according to the following categories: joint knowledge creation; knowledge sharing; new product development; new process development; new marketing strategy.

The interview-questionnaire was conducted by the phone, by request of the respondents. The researcher used a pre-designed form where the answers were registered (Figure 5.9), as well as a list of the most relevant tourism organisations located in the region, that were referred to the respondents after they had indicated all the institutions involved in cooperation or partnerships, in order to assure that the information provided by them was the most exhaustive possible.

Figure 5.9 – Form used to conduct the interview-questionnaires

Name of institution: _____

Name of respondent: _____

Organisations in cooperation	Territorial Scope				Purpose of cooperation				
	Local	Regional	National	International	Joint knowledge creation	Knowledge sharing	New product development	New process development	New marketing strategy

Source: own construction

5.3.4.5 Pilot survey

The pilot survey is a fundamental stage of a questionnaire based empirical study. It is defined as a small-scale survey applied to subjects before the launching of the final, large scale collection procedure in order to evaluate the process and the research tool (Gray, 2004).

Hill and Hill (2000) also refer the need to evaluate the adequacy of questions, of the measurement scales and the motives that may be on the basis of reduced response rates in specific questions, which may occur because they are ambiguous, too sensitive or because they demand for information that is unknown by a significant number of respondents.

The pilot survey (appendix 3) was applied to subjects with the same characteristics of the defined population, namely the managers of accommodation units, restaurants, passenger transportation firms, rent-a-cars, cultural, recreation and leisure activities. The electronic version of the questionnaire was sent in an e-mail, identifying the researcher and the university, explaining the overall objectives of this study and sensitizing the respondents to the importance of their

collaboration. This process provided important and useful insights that significantly contributed to the improvement of the research instrument. Some changes were thus needed to be made on the final questionnaire.

The wording of the questions and their interpretation presented no problems. During the design of the questionnaire, and due to the complexity of the technical terms related to the topics under study, there was a constant concern to formulate the questions with a clear and objective wording that would not evoke doubts and misunderstandings. However, some questions were redesigned and others were removed.

The first section of the pilot (*Part I – General Information*) concerned the general information of the firm, such as the name, location, tourism sub-sector, turnover and questions regarding the number and qualification of human resources. These fundamental questions returned an extremely low response rate. It was concluded that this section should then be placed in the end of the questionnaire, as respondents are more comfortable in answering more personal or sensitive questions after concluding the survey, as they may feel a closer relation the topics and with the problematic of the research. In the final version of the questionnaire, it became the *Part VI – General Information*. This strategy had a positive outcome, as the response rate to the questions increased significantly in the final data collection process.

The second part regarded the collection of data with the objective of characterising tourism firms' innovation performance and innovation activities. The initial question intended to obtain the number of innovations developed by the respondent firms in the categories defined by the Oslo Manual and used in the Community Innovation Survey: "***QII.1:*** *Please indicate the* ***number of innovations*** *developed by your firm in the last three years in the following categories: product innovation; process innovation; organisational innovation; marketing innovation*." The majority of respondents selected the option "Do not know/ Not answering", indicating that they do not have the information or do not want to provide it. In fact, considering that innovations in tourism are, as mentioned, frequently not regarded as innovation, it was considered that this question would not provide useful and rigorous information. Thus, based on the experience with the pilot survey, this indicator (number of innovations) could not be used for measuring innovation performance, because the information provided is uncertain. For this reason, it was rephrased and formulated the following way:

Q: During the last three years, did your organisation: (Please, select as many options as applied)

- ☐ Introduce a new or significantly improved tourist good or service, regarding its characteristics or final use ***(Product Innovation)***
- ☐ Implement new or significantly improved production processes, distribution methods or activities that support tourist goods or services, including significant changes in techniques, equipments and/or software ***(Process Innovation)***
- ☐ Implement a new organisational method in business practices, in workplace organisation or in firm's external relationships, regarding tourism affairs ***(Organisational Innovation)***
- ☐ Develop a newmarketing concept or strategy regarding tourism, different from the existent ones or already used by the organisation, considering product design or packaging, product placement, product promotion or pricing ***(Marketing Innovation)***

Although the new question could not give information on the number of innovations developed by tourism firms and, subsequently, the region where they are located, the obtained data informed on the number of firms that effectively innovated in the former three years and the main types of innovation that were introduced in tourism.

Important information frequently used to measure innovation performance concerns the firms' turnover that is allocated to innovation development and to the implementation of innovation activities. Thus, the pilot included the following question: *"QII.6: Please indicate which* ***percentage of your turnover*** *is allocated to: R&D; software or equipment acquisition; Patents/ Industrial property rights; Training of employees; New marketing/communication strategies."* There were very few answers registered and, among those who answered, the information given made no sense. Two situations may have occurred: the respondents do not have the information to provide, or they did not understand the objective of the question. It is believed that a significant share of tourism firms, mostly SMEs, do not have the perception of how much is spent in innovation activities. For this reason, it was decided that this question should be removed.

A final adjustment was the introduction of the option "Do not know/ not answering" in every question. This allows respondents to skip questions, avoiding random responses that could bias the results and subsequent conclusions (Hill & Hill, 2000).

5.3.4.6 Selection of the regions

The initial objective of the empirical study was to analyse three regions in different stages of development, according to Butler's Tourism Area Life Cycle model (1980), namely in the initial, development and maturity stages.

But previous to the selection of the regions, the geographical level of analysis had to be defined. In chapter 4, a deep discussion on the meaning of "region" and of "tourist destinations" was developed, especially within the topic of regional innovation systems. To analyse a region under this model, there must have precise criteria that define the territory as a functioning unit within a specific time. For the purpose of this study, and bearing in mind the considerations made for several authors on regional innovation systems, it was concluded that a tourism destination is a geographical region which is homogeneous in terms of characteristics, offered experiences, resources, image, perception and a tourism governance structure (with its goals, strategy and policy), representing thus a unique territorial unit, where administrative boundaries are not relevant and may or may not exist.

There is no consensus on the adequate geographical scale for the study of regional innovation systems. Some authors consider that cities present the most appropriate conditions for innovation (Simmie & Sennett, 1999), others study metropolitan regions (Diez, 2000), local areas such as districts within cities or clusters of specific activities, e.g. Silicon Valley (Saxenian, 1994). Several authors, based on Community Innovation Survey, use the NUT II division (Evangelista et al., 2002). As stated by Doloreux and Parto (2005), the diversity of the units of analysis contributes to the deviation of a unified conceptual framework of the "region" as an object of study. On the other hand, it also brings evidence that regional innovation systems are characterised by their diversity and depend on the economic and spatial functionality existent in each region, and thus RIS may diverge in their geographical scale.

In this research, the NUT III was considered as the most appropriate level of analysis, as they reflect, globally, homogeneity in terms of tourism resources, products, supply, demand, image, brand and perception. Moreover, this level facilitates the gathering of necessary secondary data, such as official statistics and information on tourism firms, which were necessary in order to build the population database. Also, the closer the tourism actors are located, the higher may be the

cooperation level due to the similarities in their businesses and the confluence of objectives. In Portugal, the NUT II level comprises a large territorial dimension and thus do not configure homogeneous tourism destinations, thus it was excluded as a potential unit of analysis. Three regions were initially selected, for the following reasons:

Table 5.10 – Regions selected for the empirical study

Region	Motives for selection	NUT III - Municipalities
DOURO	▪ Initial stage of tourism development, sustained by the wine tourism, rural tourism and by landscape, which is classified by UNESCO as World Heritage. ▪ Tourism is growing in importance. ▪ It has a tourism strategic plan developed by the North Coordination and Development Commission (Plan of Tourism Development for Douro Valley). ▪ There is a structure of mission for the Demarcated Region of Douro, in charge of the improvement actions for the integrated development of the region, of developing partnerships among different organisations and of executing of the Plan of Tourism Development for Douro Valley. ▪ It has a specific Tourism Board. ▪ Several projects are being developed. ▪ It appears to have an interesting dynamic in terms of tourism innovation. ▪ These factors contribute to the creation of a regional innovation dynamic in tourism.	Alijó, Armamar, Carrazeda de Ansiães, Freixo de Espada à Cinta, Lamego, Mesão Frio, Moimenta da Beira, Penedono, Peso da Régua, Sabrosa, Santa Marta de Penaguião, São João da Pesqueira, Sernancelhe, Tabuaço Tarouca, Torre de Moncorvo, Vila Flor, Vila Nova de Foz Côa, Vila Real
BAIXO VOUGA - AVEIRO	▪ Tourism is in development stage, with a growing and significant dimension in terms of economy, supply and demand. ▪ The University of Aveiro is an important centre of knowledge creation and transfer in what concerns tourism. ▪ It has a dynamic governance structure. ▪ It has a tourism strategic plan. ▪ Convenience of access to firms and organisations in the region.	Águeda, Albergaria-a-Velha, Anadia, Aveiro, Estarreja, Ílhavo, Mealhada, Murtosa, Oliveira do Bairro, Ovar, Sever do Vouga, Vagos
ALGARVE	▪ Tourism is in maturity stage, being the main economic activity of the region. ▪ It is the most developed tourist region in Portugal. ▪ It has a strong and organised governance structure. ▪	Albufeira, Alcoutim, Aljezur, Castro Marim, Faro, Lagoa, Lagos, Loulé, Monchique, Olhão, Portimão, São Brás de Alportel, Silves, Tavira, Vila do Bispo, Vila Real de Santo António

Source: own elaboration

The choice of these regions was also important due to the interest in comparing destinations with different tourism products, which results in different business structures, tourists' profiles, number of visitors, governance systems and interaction among organisations and between organisations and local communities. As referred by Doloreux and Parto (2005, p. 141), one of the objectives of empirical studies on regional innovation systems is precisely to identify "*regional differences in terms of innovation activities and regional competitiveness*", which is useful to understand the components that can contribute to create or improve a regional innovation system.

However, during the data collection process, the firms located in Algarve registered an extremely low response rate when compared to Douro and Aveiro. When contacted, the majority of firms showed no motivation or will to collaborate with the study, claiming that they had no time or interest in answering the questionnaire. The same was observed for tourism institutions, where the responsible person was frequently unavailable. For this reason, it was decided not to apply the questionnaire in Algarve. This situation brought some implications for the objectives of the empirical study, some of them related to the role and dynamics of innovation systems in tourism destinations in different stages of development. The conclusions drawn on these matters were thus based on the analysis of the data collected in Douro and Aveiro, which are also in distinct stages. Thus, the decision of excluding Algarve from the analysis did not affect the objectives of the research neither the expected findings. The robustness of the selected method as well as the reliability of the final results are maintained. Nevertheless, further research would benefit from a more extensive fieldwork including not only Algarve, but also other regions.

5.3.4.7 Defining the population of tourism firms

Population refers to all the study subjects or units that are the focus of the research, while the target population comprises the units in the population that the researcher wants to study.

The developed conceptual and methodological framework for a regional tourism innovation system (see chapter 4, section 4.3), identifies the types of actors that comprise them: tourism firms and tourism related institutions. These two different types of organisations relate to different dynamics within innovation systems. Thus, the information that can be obtained from

them is quite different. In result, and in order to accomplish the objectives of this research, two complementary empirical studies were conducted: one aimed at analysing the dynamics of regional tourism innovation systems from the perspective of firms; the second was developed with the objective of understanding the institutional framework of support of regional tourism innovation systems, and therefore the main goal was to gather sociometric data of regional tourism institutions in order to apply the previously mentioned social network analysis methods.

As mentioned before (chapter 4, section 4.2.4), while conceptualising tourism as a system, the definition of tourism supply is best achieved when considering Tourism Satellite Account's guidelines. This approach allows defining the tourism economic structure through the identification of tourism-specific activities. Therefore, for the purpose of this study, the tourism firms to be considered as the population are those who that fall into the following categories:

1) **Accommodation**
2) **Food and beverage**
3) **Passenger transport services**
4) **Transport rental services**
5) **Travel agencies, tour operators and tour guides**
6) **Cultural services**
7) **Recreation and leisure services**

In order to obtain a more precise definition of the above mentioned groups, each category was further analysed and specific types of firms were detailed. This helped to create a more comprehensive basis for the subsequent definition of the target population. This first approach was developed based on the Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE. The corresponding NACE codes were assigned to each of the seven groups. At this stage, an initial focus was needed, which was accomplished by removing some NACE code activities that go beyond the scope of our analysis (either in economic terms, or in what concerns regional specificities). Also, for the accommodation group, one chose to apply the typologies and classification defined by the Portuguese law instead of NACE codes which are not sufficiently refined. The overall population definition is presented in table 5.11.

Table 5.11 – Categories of the overall population of tourism firms

Designation		
Accomodation		
	Hotels and Similar accommodation	
		Hotels
		Pousadas
		Motels
		Apart-hotels
		Holiday Villages
		Tourist Apartments
		Hostels
		Inns
	Rural Tourism	
		Manor Houses
		Rural Houses
		Agritourism
		Village Houses
		Country Houses
		Rural Hotels
Food and Beverage		
	5610 – Total Restaurants, excluding catering and beverage serving activities	
Travel Agencies and Tour Operators		
	791 – Total Travel Agencies and Tour Operators	
Transports		
	50300 – Inland passenger water transport	
	50102 – Sea and coastal passenger water transport	
Rent-a-Car		
	77110 – Renting and leasing of cars and light motor vehicles	
Cultural Services and Activities		
	91020 – Museums	
	91030 – Historical sites and buildings and similar visitor attractions	
	91042 – Natural parks and reserves	
Recreation and Leisure Services and Activities		
	93210 – Amusement and theme parks	
	93292 – Marinas	
	93293 – Organisation of tourism recreation and events	
	93294 – Other recreation and leisure activities, n.s.	

Source: own construction based on UNSD et al. (2008) and INE (2007)

This initial approach proved to be extremely useful for research regarding tourism firms, as it clearly identifies the industry's economic structure. However, some additional issues were taken into consideration:

- This research is about innovation, particularly in tourism firms and destinations. Innovation is strongly related to economy and to development. Thus, despite the importance that institutions/ non-profit organisations have in supporting innovation and

knowledge creation and transfer, firms are effectively the main agents of innovation, as they are the main vehicles of the development of new products and services placing them in the market.

- Several tourism firms are registered under different NACE codes, some of which are not related to tourism. This occurs mainly in recreation and leisure activities.

For these two main reasons, it was concluded that the types of firms defined above do not provide a thorough and comprehensive list of tourism specific activities, therefore not fully satisfying the objectives of the study. Thus, a second effort was undertaken in order to clearly identify and narrow the types of firms within those groups that are effectively relevant for tourism economy and innovation, providing useful contributions to this study and avoiding biased results. In order to do so, some additional filters were introduced.

For the definition of the typologies of accommodation firms to include in the study, all the legally defined typologies were considered, except hostels, inns and hotels or similar with one or two stars. Considering that the objective of this research is to evaluate innovation dynamics (rather than tourism economic significance), these firms were excluded as they do not have a relevant impact in innovation performance. As for rural tourism accommodation units, all categories were included. To sum up, the target population of lodging facilities includes:

- Hotels (five, four and three star)
- Pousadas
- Apart-hotels (five, four and three star)
- Holiday villages (five, four and three star)
- Tourist apartments (five, four and three star)
- Rural tourism establishments (Manor Houses, Rural Houses, Agritourism, Village Houses, Country Houses and Rural Hotels)

The initial analysis of **food and beverage** units was conducted using NACE codes Rev. 3. At this stage, the firms considered were the ones classified under the broad NACE code 561 - restaurants and mobile food service activities, which includes the following:

- 56101 - Traditional restaurants
- 56102 – Snack-bars
- 56103 – Self-service restaurants

- 56104 – Typical/ characteristic restaurants
- 56105 – Restaurants will dance hall
- 56106 – Take-away restaurants
- 56107 – Restaurants, non-specified (includes mobile food services)

These classifications comprise a significant number of firms, in a total of 1483 [18] for the two NUT III regions under analysis. Although, it is known that some are more significant for tourism than others. Bearing this in mind, and at a first approach, it was thought to include in our target population only the restaurants classified as *traditional* (NACE 56101) and *typical/ characteristic* (NACE 56104), which summed up 676 units.

However, after the introduction of this first filter, it was considered that the population still comprised units that would not fit entirely in the tourism industry and that would not provide relevant contributions to the research, with the risk of skewing the results. It should be reminded that the main purpose is to assemble an approximation to the tourism system and to the innovation system that underlies it. Therefore, we moved towards a different approach, which simultaneously allowed to narrow the size of the targeted population, on one hand, and to specifically identify the restaurants to include in the survey, on the other.

Within this scenario, a research was made on the main instruments and tools of restaurants' classification, attribution of prizes and distinctions, and recommendation of restaurants to tourists. The criteria applied to the selection of the restaurants were the following:

- Restaurants classified by *Turismo de Portugal* (National Tourism Institute) as *Luxury Restaurant*, *Typical Restaurant* or *Restaurant with Interest to Tourism*[19];
- Restaurants recommended by the project "Taste Portugal" (*Prove Portugal*)[20];
- Restaurants recommended and awarded by the "*Guia Escape*"[21]. In this case, it was only considered the restaurants with an average price per person above 15 Euros;
- Restaurants considered by AHRESP (Portuguese Association for Hotels and Restaurants) as the best in Portugal[22].

[18] Data from 2008 (the most recent for this level of analysis).
[19] Information obtained by personal communication.
[20] The Taste Portugal program intends to establish Portugal as gastronomic destination country, creating both a national and international awareness of Portuguese gastronomy's qualities. It consists of a diversified program of actions, aimed at several national and international target audiences.
[21] A tourism guide published once a year by a distinguished and trustworthy paper, 'Expresso' and that is probably the most important and reliable published in Portugal.

It was considered that the restaurants that followed these criteria were the ones with a higher relevance for tourism innovation dynamics. When applied cumulatively, they provided the following results:

- 38 restaurants in Douro
- 58 restaurants in Baixo Vouga

From this group, the restaurants that were part of accommodation units were identified and excluded, in order to avoid the survey duplication in the same establishments. Finally, the target population of restaurants is of:

- 33 restaurants in Douro region
- 52 restaurants in Baixo Vouga region

In what concerns **transports**, a first review of the NACE codes was made. The following were considered to be important for tourism system innovation dynamics in the regions under study, and were thus included in the population:

- 50102 - Sea and coastal passenger water transport
- 50300 – Inland passenger water transport

Firms that operate on the transportation of goods, road and rail transports were excluded, as they present a very high proportion of non-tourism flows. Air transport category was also excluded due to the fact that it is not relevant for the Douro and Aveiro regions.

When analysing the National Registration of Tourism Leisure and Recreation Activities [23] (particularly the section of Tourism-Maritime Operators), a database provided by *Turismo de Portugal* (National Tourism Institute), it was concluded that there are several firms performing this activity, but their NACE codes do not match with the ones previously selected for this categoty (50102 and 50300). For this reason, a new category was created, with the purpose of including all the firms registered in that database as Tourism-Maritime Operators, but with a NACE code different than the ones already considered. For the Douro region, no record was found; in Baixo Vouga, two firms were found.

[22] Information obtained by personal communication.
[23] In Portuguese: RNAAT – *Registo Nacional de Actividades de Animação Turística*.

For the **rent-a-car** group, all the firms classified as *77110 - Renting and leasing of cars and light motor vehicles* were considered. This choice softens the effect of the exclusion of road transports, as this type of service is usually used by tourists and visitors.

The **travel agencies and tour operators** included in target population were those that fall under the NACE code 791 – Travel Agency and Tour Operator activities:

- 79110 – Travel agency activities
- 79120 – Tour operator activities

It was decided to exclude the category 79900 – Other reservation service and related activities, as the majority of these firms do not operate within tourism activities. This conclusion was withdrawn after a refined (one by one) analysis of the firms registered under this classification.

In what regards **cultural services**, the NACE codes included in the targeted population were:

- 91020 – Museums
- 91030 – Historical sites and buildings and similar visitor attractions
- 91042 – Natural parks and reserves

However, while analysing the related statistics (number of organisations in each category), it was immediately detected a great discrepancy with reality: for the total of the two NUT III regions, the National Statistics Office only presented 23 historical sites and buildings and similar attractions, and no museums or natural parks and reserves. For this reason, alternative sources of secondary information were selected in order to thoroughly identify the number of organisations in each NACE group and, simultaneously, their name, location and contacts.

For the museums, it was possible to account for the number of targeted organisations through the following sources:

- Portuguese Museums Institute, namely the Portuguese Museums Network (PMN), "*composed by 131 museums, including the 28 museums and the 5 palaces under the tutelage of the Museums and Conservation Institute, the 14 museums of Azores and Madeira (integrated in the PMN by protocol) and other 84 museums that integrated the PMN by application"* (Instituto Português de Museus, 2011).

- Platform "Discover Portugal" (*Descubra Portugal*), an initiative of the National Tourism Institute (*Turismo de Portugal*) that, through a detailed research engine, allows to identity the several Portuguese tourism resources and attractions by municipality (Turismo de Portugal, 2011).

Using this method, it was possible to identify 27 museums in Douro and 30 museums in Baixo Vouga.

Historical sites and buildings include a wide diversity of elements, namely churches, chapels, and other religious, civil and military heritage. The survey of these attractions does not meet the objectives defined for the research, as they are not firms neither organisations. Hence, it was decided to interview the non-profit organisations with the control of these units, namely the North Regional Directorate for Culture and the Centre Regional Directorate for Culture (see the following section).

As for natural parks and reserves, it was chosen to consider the national protected areas, which include the following categories: National Park, Natural Reserve, Protected Landscapes, and Natural Monuments. For the NUTs III in study, there is one Natural Park in Douro and one Natural Reserve in Baixo Vouga. The information was collected through the ICNB (Institute for Nature and Biodiversity Conservation).

Finally, for the **recreation and leisure services** the following NACE codes were selected:

- 93210 – Amusement and theme parks
- 93292 – Marinas
- 93293 – Organisation of tourism recreation and events
- 93294 – Other recreation and leisure activities

To the total of firms considered by the National Statistics Office for the NACE 93293, the firms registered in the National Registration of Tourism Leisure and Recreation Activities (RNAAT) were added which, despite not being a comprehensive database, comprises a considerable number of tourism recreation and events firms. In face of this situation, it was concluded that there were several tourism recreation firms registered as such in the National Registration (RNAAT), but with NACE codes different from the initially considered for the population (93293). Therefore, in order

to obtain more rigorous results, it was decided to include the firms that integrate RNAAT, but with a NACE code distinct from the one initially considered. It was then created a new category named "Tourism Recreation Firms", resulting from the sum of the NACE 93293 with the recreation firms listed in RNAAT.

In what concerns NACE 93294 – other recreation and leisure activities, an inverse process was developed. When analysing the list of firms registered under this classification, it was concluded that several of them are completely unrelated to tourism, together with others that are, in fact, tourism-specific. Within this context, each firm was individually analysed and, in order to achieve a population that is as close as possible to the reality and to the objectives of the research, it was decided to exclude those that do not perform tourism related activities. The same occurred with firms in individual name (for the ones which was not possible to determine the developed activities). The category was renamed to Leisure and Recreation Tourist Activities.

After this process, it was possible to determine the categories of firms to include in the population, as well as to collect statistics on the number of companies on each of them. In order to accomplish this, different sources were used and information was crosschecked to obtain a target population the most reliable and close to reality possible.

At this stage of the population definition process, accommodation units, rural tourism houses and restaurants were specifically identified by name and contacts. The same occurred to the tourism recreation firms registered in RNAAT (National Registration of Tourism Leisure and Recreation Activities). However, the remaining categories needed additional work on individually identifying each firm. In order to do this, a directory of Portuguese firms was used. It provided the names, location and contacts, both at NACE codes (five digits) and at municipal level. This allowed building an extensive directory of firms for the research, according to the detailed categories initially defined and matching the statistics of number of firms. In addition, it was also possible to identify firms that, despite being in the directories, were no longer operating and, this way, identifying the total population more rigorously (Table 5.12).

Table 5.12 – Target Population: number of firms by detailed category and region

Categories	Number of Firms		Sources
	Douro	Baixo Vouga	
Accommodation	**15**	**24**	INE, Tourism Statistics, 2009 TP, RNET, 2011 Pousadas de Portugal, 2011
Five star hotels	2	1	
Four star hotels	5	7	
Three star hotels	4	14	
Pousadas	2	1	
Five star apart-hotels	0	0	
Four star apart-hotels	0	0	
Three star apart-hotels	0	1	
Five star holiday villages	0	0	
Four star holiday villages	0	0	
Three star holiday villages	0	0	
Five star tourist apartments	1	0	
Four star tourist apartments	0	0	
Three star tourist apartments	1	0	
Rural Tourism	**68**	**10**	List provided by Turismo de Portugal - TP (Portuguese Tourism Office), 2011
Manor Houses	15	9	
Rural Tourism Houses	30	0	
Agritourism	9	1	
Village Tourism Houses	1	0	
Country Houses	11	0	
Rural Hotels	2	0	
Restaurants	**33**	**50**	List provided by TP, 2011 Proveportugal.pt, 2011 List provided by AHRESP, 2011 Tour Guide Escape, 2011
Transports	**2**	**6**	INE, Firms Integrated Accounts System, 2008 Informa D&B [24], 2011 RNAAT, 2011
50102 - Coastal water transport	0	0	
50300 - Inland water transport	2	4	
Tourism-maritime operators	0	2	
Rent-a-Car	**9**	**14**	INE, Firms Integrated Accounts System, 2008 Informa D&B, 2011
Travel agencies and tour operators	**11**	**34**	INE, Firms Integrated Accounts System, 2008

[24] Informa D&B is an online database with a comprehensive directory of firms by NACE code – 5 digits and geographical location (http://directorio.informadb.pt/).

Categories	Number of Firms		Sources
	Douro	Baixo Vouga	
			Informa D&B, 2011
Cultural Activities	**25**	**30**	INE, Firms Integrated Accounts System, 2008 Portuguese Museums Institute, 2011 Descubraportugal.com.pt, 2011 ICNB, 2011
Museums	24	39	
Natural Parks and Reserves	1	1	
Leisure and Recreation Activities	27	23	INE, Firms Integrated Accounts System, 2008 TP, RNAAT, 2011 Informa D&B, 2011
93210 - Leisure and theme parks	1	1	
93292 - Marinas	0	1	
Tourism Recreation Firms [1]	18	16	
Leisure Activities [2]	8	5	
TOTAL	**190**	**191**	

Source: own construction based on identified sources

[1] NACE 93293 plus RNAAT records

[2] NACE 93294 minus non-tourism firms

With the objective of reducing the chances of a low response rate, which is frequent in empirical studies aiming at firms' top managers, and also due to the low quantity of tourism firms comprising the population, it was decided by the researcher to survey all the identified firms, and thus not moving towards a sampling process.

5.3.4.8 Defining the population of tourism institutions

As mentioned in chapter 4, besides firms, non-firm organisations are important components of regional innovation systems (Edquist & Johnson, 1997). While firms may constitute the agents of innovation by creating it and placing it on the market, institutions provide the support framework that strongly influences the dynamics of RIS and may be co-creators of innovation (Amin & Thrift, 1995). Bearing this in mind, a second empirical study was carried out, aiming at the superstructure of regional tourism, that is, non-firm organisations that are placed in the interface of tourism innovation, as it results from institutional support, funding, human capital and knowledge produced by universities, etc. Costa (1996) demonstrates that the most prominent and central organisations in regional tourism are from the public sector, and not private organisations.

Moreover, institutions play a relevant role in shaping the local context for knowledge sharing and in providing support infrastructures and frameworks for the use of knowledge within innovation systems, developing the capacity of association of the system (Cooke & Morgan, 1998; Howells, 2002). Molina-Morales and Martínez-Fernández (2010) also refer the importance of institutions in creating value for innovation systems by supporting firms with services and benefits such as innovation support, training activities for employees, undertaking research projects together with local firms creating knowledge spillovers for the region, promoting regional firms and products in external markets and through funding. They also act as repositories of knowledge and identifiers of new opportunities due to their positions as intermediaries as they are in frequent contact with several distinct external actors (they are often part of broader associations) and simultaneously close to local firms.

Institutions set the conditions that determine the functioning and dynamics of innovation systems. They have the ability to influence innovation within tourism destinations by defining policies, laws, rules, conventions, behaviours, funding, identification of market opportunities, etc. Therefore, regarding their importance and representativeness, it was considered fundamental to survey regional tourism institutions representatives. Moreover, their supra-firm nature can provide this study with important insights on regional tourism innovation.

Malerba (2005) includes universities, research centres, financial institutions, government agencies, associations, trade unions, sub-units of larger organisations (e.g. in the form of their R&D departments) and groups of organisations (industry associations) as the main institutions comprising RIS.

For the purpose of this study, these organisations were classified into four different groups, according to the different functions and roles played in fostering innovation:

1) **Knowledge and education system;**
2) **Tourism public organisations;**
3) **Tourism business associations;**
4) **Innovation agencies.**

Table 5.13 – Target Population: number of institutions by category and region

Group	Institutions	
	Douro	Aveiro
Knowledge and Education System	▪ University of Trás-os-Montes e Alto Douro (UTAD) ▪ CETRAD Research Unit ▪ Technology and Management School - Viseu Polytechnic Institute ▪ Douro-Lamego Hospitality and Tourism Training School	▪ University of Aveiro ▪ GOVCOPP Research Unit ▪ EFTA – Tourism training school of Aveiro ▪ EPADRV – Training school of Vagos ▪ IDTOUR unique solutions (tourism spinoff)
Tourism public agencies	▪ Douro Tourism Board ▪ CCDR-N – Comissão de Coordenação e Desenvolvimento da Região Norte (North Regional Coordination and Development Commission) ▪ CIMDOURO – Association of Municipalities of the Douro Region ▪ Douro and Porto Wines Institute ▪ Regional Directorate for Culture of North Portugal	▪ Central Portugal Regional Tourism Board ▪ CCDR-C - Comissão de Coordenação e Desenvolvimento da Região Centro (Centre Regional Coordination and Development Commission) ▪ CIRA - Association of Municipalities of the Aveiro Region ▪ Regional Directorate for Culture of Central Portugal
Tourism business associations	▪ AHRESP – Portuguese Association for Hospitality, Restaurants and Similar (Douro branch) ▪ AETUR – Association of Tourist Businesses of Douro and Trás-os-Montes ▪ AEHTD – Association of Hospitality and Tourism Businesses of Douro ▪ NERVIR – Business Association ▪ Porto Wine Route Association	▪ AHRESP – Portuguese Association for Hospitality, Restaurants and Similar (Aveiro branch) ▪ Bairrada Wine Route Association ▪ PRIVETUR – Rural Tourism Association ▪ AIDA – Industrial Association of Aveiro Region
Innovation agencies	▪ CITMAD – Trás-os-Montes and Alto Douro Innovation Centre	▪ INOVA-RIA – Aveiro Network for Innovation ▪ IAPMEI – Agency for Competitiveness and Innovation (Aveiro branch)
Total	**15**	**15**

Source: own construction

In order to select the institutions to be included in the study, the first step was to identify the members of the Regional Tourism Board. While in Douro there was a specific tourism board for the NUT III (*Polo de Turismo do Douro*), the NUT III Baixo Vouga (Aveiro region) is comprised in a much broader Regional Tourism Board, the Central Portugal Tourism Board (*Turismo Centro de Portugal*) at NUTII level. This situation leads to the need of a more rigorous search on which regional institutions should be included in the survey of Aveiro. As a starting point, the legal

norms that regulate the Regional Tourism Boards were analysed, as they clearly indicate which institutions are part of their general assembly. While concluding that several important organisations with intervention in tourism and innovation were not present, other searches were made, namely in the Internet, in order to identify all the institutions that could be classified under the groups mentioned above. The final result is presented in table 5.13.

The results from the questionnaire applied to these institutions provided important data for the development of social network analysis, which is not usually used in other studies on the matter and brings clear evidences on the role of non-firm organisations in the strength of regional tourism innovation systems. Some of the main objectives of the survey applied to institutions are:

- To gather relational data that helps to understand the institutions role in fostering innovation in the tourism destination;
- To identify the main patterns of cooperation among institutions regarding tourism innovation activities and processes;
- To identify the most prominent actors in the innovation network, which are the ones who play the most important roles within the regional tourism innovation system;
- To characterise the regional knowledge infrastructure in the tourism destinations, and to identify their importance in the creation and development of tourism innovation, by creating and sharing knowledge and producing human capital.
- To analyse the main relations that exist in a specific period of time (the last three years, following the methodology of Community Innovation Survey). This pattern of relations may change in the future, for instance, with a new Community Support Framework that privileges the funding of different projects, or with new innovation policies, research and development guidelines, etc.

The survey was applied to the identified institutions which, by their turn, indicated others with which they had established relations within tourism innovation, in a method similar to a snowball sampling. In result, despite the fact that the target population is composed of 15 institutions in each region, the results provided us information about a tourism innovation network with 55 members in Douro and 87 in Aveiro.

5.3.4.9 Data collection

Data collection refers to the process of operationalisation, that is, the transformation of hypothesis into empirically observable statements (Corbetta, 2003). As observed in Pizam's model (Figure 5.2) there are three methods of collecting data: observation, direct communication and secondary data. This research, for the previously mentioned reasons, used the direct communication data, by means of surveying the selected population. The survey was used in both empirical studies: two different questionnaires were designed, one applied to tourism firms, and the other applied to tourism institutions (Figure 5.6).

The questionnaire-survey for tourism firms was designed to be carried out online. It is known that in the late twentieth century, the use of ICT by the general public and the private sector increased significantly. In tourism, ICT achieve an undeniable importance, as e-commerce, e-travel, e-business and e-marketing are changing the business environment (Jennings, 2001). This factors are contributing to a higher competitive rivalry among tourism firms, which demands for a mandatory online presence and the adoption of technology by tourism firms, in order to maintain their competitiveness in the global marketplace (Buhalis & Costa, 2014). Tourism organisations are, therefore, highly engaged in ICT hardware and software, which allowed to effectively reach the target population. Online surveys present some interesting advantages (Wright, 2005):

- The majority of organisations have moved online. They not only offer information to consumers, but also present opportunities for researchers;
- The internet provides access to individuals who could otherwise be unavailable or difficult to reach;
- It is a method that saves time, as it allows: (i) to reach many individuals in a short amount of time; (ii) to collect data while researchers are working on other tasks; and (iii) can be linked to data analysis programs and the database is automatically constructed;
- It overcomes geographic distances;
- Are cost-effective, as paper surveys tend to be costly, even for small samples.

A first round was launched, through an e-mail that was sent to the previously identified firms, explaining the main objectives of the research and asking firms' managers to answer the survey online. Out of this first round, one were able to gather 79 valid surveys, which correspond to a response rate of 38,3% of the total population. This e-mail was sent again to non-respondents,

this time followed by a telephone call, in order to personally ask managers to respond to the online survey and thus to increase the response rate of the study. While it was observed that it was still low and far from what was considered necessary to carry out valid analysis and to obtain solid results, a third stage was implemented. This third stage involved making the survey by telephone. This increased the response rate to 263 surveys, out of which 206 were valid. Considering our target population of 381 firms, this represents an overall response rate of 54,1%. It was considered satisfactory, as it surpassed the value defined for an eventual sample[25]. Tarnai and Paxson (2004) claim that firms surveys usually register very low response rates (between 10% and 50%). Also, Baruch and Holtom (2008) concluded, from an analysis of 1607 studies that the average response rate when using data collected from organisations is of 35,7%.

Some authors actually suggest a mix-mode strategy as a mean to minimise non-responses or a low response rate (Dillman, 2000). The telephone has indeed several advantages that contributed to increasing the response rate, namely the fact that there is a personal contact that may push people to respond. Also, the lack of understanding that could have been the reason for non-response can be overcome as the interviewer can explain any doubts or misunderstandings.

Table 5.14 – Survey population and response rate, by region

	Douro	Aveiro	Total
Population	190	191	381
Nr. of responses	**109**	**97**	**206**
Response rate	57,4%	50,8%	54,1%

Source: own construction

When comparing both regions, it is observable that the survey applied in Douro presented a higher response rate that the same one in Aveiro. Curiously, both target populations register a very similar value (Table 5.14).

Another interesting analysis that can bring some insights for future research is the response rate by type of tourism firm, which also differ between both regions. Tables 5.15 and 5.16

[25] If we had undertaken a sampling process, applying the formula **$S= [Z^2 x (p) x (1-p)]/ C^2$** the sample size would be of 195 individuals, for a confidence level of 95%. Neuman (2000) suggests that, for populations under 1.000, researchers should sample 30% of the population. In this case, it would be of 115 firms (or 57 in each region individually). With both methods, the sample value was surpassed.

demonstrate the obtained values. In Douro, travel agencies, accommodation firms and cultural activities register the highest participation rates, while transportation and rent-a-car firms show a residual expression. In Aveiro, restaurants stand out with the highest rate, followed by accommodations and recreation activities. Transportation and rent-a-car companies also present the lower values. This may occur due to the fact that most of these business do not regard their activities as tourism-related, as some mentioned during the phone survey.

Table 5.15 – Population and response rate in Douro, by tourism sub-sector

	Population	Nr. Reponses	Response Rate
Accommodation	83	52	62,7%
Restaurants	33	19	57,6%
Transportation	2	0	0,0%
Rent-a-Car	9	1	11,1%
Travel agencies/Tour Operators	11	8	72,7%
Cultural Activities	25	15	60,0%
Recreation Activities	27	14	51,9%
TOTAL	**190**	**109**	**57,4%**

Source: own construction

Table 5.16 – Population and response rate in Aveiro, by tourism sub-sector

	Population	Nr. Reponses	Response Rate
Accommodation	34	22	64,7%
Restaurants	50	36	72,0%
Transportation	5	1	20,0%
Rent-a-Car	14	0	0,0%
Travel agencies/Tour Operators	35	14	40,0%
Cultural Activities	30	11	36,7%
Recreation Activities	23	13	56,5%
TOTAL	**191**	**97**	**50,8%**

Source: own construction

The data collection process regarding both the survey of firms and institutions were carried out between January and August of 2012. As mentioned, there was no sampling process. A total of 381 questionnaires were sent to tourism firms, distributed according to the information provided in tables 5.16 and 5.17, out of which 263 were received and 206 were considered valid.

After this phase, the researcher engaged in the coding of the variables. In an initial stage, coding involved 262 different variables. However, new variables were created, such as latent variables,

while others were transformed and/or recoded. In the end of this process, the final database was composed by 311 variables. These were classified according to their type (nominal, ordinal, dichotomous, interval, ratio) and defined in terms of concepts and expected results. This helped the subsequent selection of the proper statistical tests and the analysis to be conducted.

5.4 Data analysis procedures

The data analysis is the method of processing and interpreting the statistics previously collected and analysed, with the objectives of converting data into information and knowledge and validating the hypothesis. As mentioned, this research comprises two empirical studies, each subject to a different process of data analysis.

» Data analysis of firms survey

The data collected from the questionnaires applied to firms was processed with the software IBM SPSS 19. The database was constructed based on the defined variables and the data coding. After this step, a data cleaning process was carried out, in order to identify, prevent and correct errors resulting from data entry. This was conducted by means of extracting the frequencies of every variable and checking the existence of outliers and missing values.

All variables were subjected to a descriptive analysis. Descriptive statistics focus on the study of non-uniform characteristics of the observed units (Pestana & Gageiro, 2005). In this context, the analysis focused on absolute and relative frequencies and the calculus of central tendency measures, namely the mean, mode and median (when justified) and measures of dispersion (standard deviation). Also, cross-tabulations were extracted especially between independent variables (general information on the surveyed firms) and dependent variables, to investigate the responses given by different groups of individuals.

Inductive statistics allows, based on the observed elements, to draw conclusions to a broader environment where those elements belong to. Inferences are made through confidence intervals and parametric and non-parametric tests (Pestana & Gageiro, 2005). To this regard, the aim was to determine the relationships and differences between variables.

In order to evaluate the relationships between variables, the Independence Chi-squared tests (x^2) were computed, as well as related statistics, namely the Pearson's Chi-Square test, which informs on the existence or absence of relationships. Thus, when the significance level was below 0,05, the null hypothesis (of independence between variables) could be rejected and the existence of relationship was confirmed. In order to obtain a more complete analysis, the Pearson's Contingency Coefficient (C) was also computed. This test's results provide the degree of association (or the strength of association) between the variables.

It was also fundamental to analyse the differences in opinions and responses between groups that were statistically significant. This was accomplished by the use of the independent samples t-test (or t-student) when there were only two groups to be analysed; and the One-way ANOVA (analyses the effect of a factor in the endogenous variable, testing if the averages on the endogenous variable in each category of the factor are equal or not) when there were more than two groups. In order to apply these parametric tests, it is necessary to verify the existence of a few assumptions (Howell, 2008; Pestana & Gageiro, 2005):

- Normality of distribution;
- Homogeneity of variance;
- Scale variables (interval or ratio);
- The observations are independent of each other;
- There should be at least 30 subjects.

Therefore, the tests of normality of distribution Kolmogorov-Smirnov and Shapiro Wilk were applied, as well as the Levene test for homogeneity of variance. When the assumptions were not met, the non-parametric alternatives were applied to the variables in study, namely the Kruskal-Wallis test (alternative to One-Way Anova) and the Mann-Whitney test (alternative to t-test).

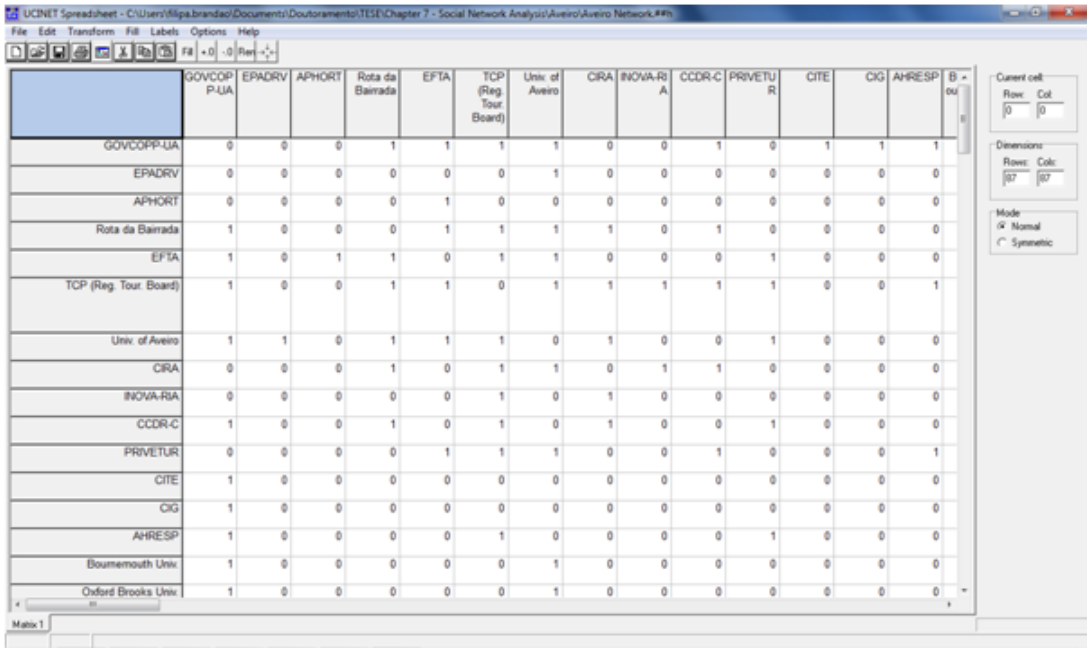
» Data analysis of institutions survey

The survey that was applied to tourism institutions had the main objective of gathering relational data to be processed according to the social network analysis methods and techniques. Despite the enormous amount of metrics available for the study of SNA, a comprehensive study was carried out, based both on theoretical issues and empirical studies, in order to define the most adequate measures to analyse innovation networks and networks within regional innovation

systems. The metrics used and their implications for the study of innovation networks are presented in table 5.5.

The network data was processed with the software UCINET 6 (Borgatti et al., 2002). Two main matrices were built in order to describe the structure and contents of the both sets (Douro and Aveiro). A network matrix comprises rows and columns (where the actors or nodes are represented). The most common approach to scaling relations between actors is by using a binary system that distinguishes between the absence of relations (cells are coded zero) and the presence of ties (cells are coded one). This method was the one used in this analysis. However, a multiple-category nominal measures of relations can also be used, when each person's relationship to the subject is coded by its type, such as “friend, business relation, kin, no relationship” (Hanneman & Riddle, 2005).

Figure 5.10 – UCINET matrix of network data



Considering the objectives of this empirical study, several different matrices were built for each region, in order to subsequently compute the selected metrics and make the necessary comparative analysis:

- An "overall" matrix representing the existence or absence of ties between actors regarding the development of tourism innovation;
- A "regional" matrix, where all the external (national and international level) actors were removed. This originated a network comprising only the local and regional tourism institutions, which allowed the comparison with the metrics computed for the "overall" network (in what concerns the structure, components, centrality and cohesion) and provided important insights on the embedding of relations within tourism innovation processes;
- One individual matrix for each of the five innovation activities: (i) knowledge creation; (ii) knowledge sharing; (iii) new product development; (iv) new process development; and (v) new marketing strategies. Through this method, one were able to compute the previous mentioned metrics and compare the results, which allowed to compare and characterise the specific network of activities regarding their structure, components, centrality and cohesion;
- Additionally, due to the need to compare the networks' structure and metrics according to the geographical scope of actors and the organisational type, two attribute data sets were created for each region. Each node was given an attribute (local, regional, national and international, for the geographical scope; and knowledge/education, public organisation; consultant, private organisation and innovation agency, for the organisation type). These attributes were inputted into a partition matrix, or a separate attribute data file. This is a useful tool for analysing how network patterns differ within and between partitions (types of nodes) and the amount of connection within and between groups.

The network analysis was divided into three main dimensions, each comprising different measures presented in table 5.5. To sum up, the following dimensions were considered:

- **Centrality**: analysis of degrees, betweenness, closeness and network centralisation;
- **Connectivity or cohesion**: analysis of density, distances, maximum flow, point connectivity, clustering coefficient, external-internal index and small-world coefficient;
- **Structural roles and positions**: structural holes measures (effective size, efficiency and constraint) and brokerage (types of brokers).

When analysing networks and their measures, it is difficult to understand whether the result is high or low, that is, most of these metrics do not have an "absolute" meaning, although they can provide important information on the differences between the outcomes and a reference or null model (Baggio, 2008). Random networks based on an observed network are often used to create a "benchmark" value. These random networks are created using the exact same number of nodes and ties, and these ties are distributed randomly. Following the method used by Baggio (2008) and Baggio, Scott, and Cooper (2002), the reference values were obtained by calculating the average of ten random networks, using the Erdös-Rényi model, where the networks comprise a specific number of nodes (matching the observed network) and the links are placed randomly between pairs of nodes, assigning each dyad a uniform probability (*p*) of having a tie based on the number of observed ties. The results of the metrics computed for the *real* networks were then compared to the reference (null) model.

With regard to the graphic display of the networks, sociograms were built. These are graphics consisting of points (nodes) that represent actors, and lines (edges) that represent relations. This was achieved using Netdraw 2.111, a software integrated in UCINET that collects data from the matrices to build the required sociograms. When necessary, the attributes regarding the geographical scope and the type of organisation were assigned to each node, in favour of providing a better understanding of the structure and patterns of relationships within the different networks.

5.5 Conclusion

This chapter begins by presenting the theories that support the different epistemological perspectives. This is an important issue to be addressed, considering that the ontology and epistemology of the scientific method will determine the research paradigm and the used research methods and techniques. According to this, this thesis adopts a positivist paradigm, which points to a quantitative and inductive approach, based on the reliability of the results that can thus be generalised.

Subsequently, the research framework is explained. This is made by addressing conceptual issues about the scientific method and simultaneously their application to this research project. Firstly,

the process of literature review is analysed, indicating the fields of study and the relations between them, that is, the conductive line of thought that guided the conceptual part of this thesis. This is followed by the identification of the objectives and hypothesis outlined.

Two distinct but complementary empirical studies were developed in order to fulfil the objectives and to provide safe ground for the validation of the hypothesis. The first is based on a questionnaire survey applied to tourism firms and the second is directed to institutions. The later provided the necessary information to conduct a sociometric analysis. Considering the options made, one section is dedicated to the analysis of significant empirical studies on regional innovation systems, especially in what concerns the adopted research framework; and a second one presents an extensive review on the methodology and metrics used in social network analysis.

Following the conclusions of this analysis and the contributions of literature review, the surveys were designed in accordance with the defined objectives and hypothesis. Both surveys were applied in the NUT III regions of Douro and Baixo Vouga (Aveiro). The process of selection of both populations is also addressed: one study is directed to tourism firms according to the economic structure of tourism (characteristic activities) as defined by World Tourism Organisation, while the other targeted the institutions related to the tourism system and the innovation system as considered within the regional innovation systems conceptual framework.

The use of this complementary approach provided clearer insights on the nature, extent and functioning of regional tourism innovation systems, as it comprises firms and institutions, as well as the different dimensions of analysis and implementation of the innovation model to tourism industry presented in chapter 4.

The two following chapters present the results of the empirical studies, which were obtained with the use of the procedures explained in the end of this chapter.

Chapter

6

Tourism firms and regional innovation

6.1 Introduction

This chapter presents the results obtained from the tourism firms' survey on their practices regarding regional innovation and aims at understanding the patterns of regional tourism innovation systems at the firm level. It starts by briefly characterising the regions analysed in the thesis (Douro and Baixo Vouga) as tourism destinations, including statistical data on the evolution of the tourism industry (section 6.2). Then, the respondent firms are characterised in what concerns the overall internal information such as their core business, age, dimension and employees related factors (section 6.3.1). Section 6.3.2 deals with firms' innovation performance, followed by the analysis of the patterns of tourism innovation networks and their importance for regional tourism innovation (section 6.3.3), the role of regional knowledge infrastructure within innovation processes (section 6.3.4) and the contribution of regional specific factors for the development of tourism innovation (section 6.3.5). The last section includes the perception of tourism firms regarding several dimensions of regional innovation environment and tourism development (section 6.3.6). Data is analysed by using IBM SPSS 19 software. Descriptive and inductive statistics are used, and several parametric and non parametric tests are computed.

6.2 Background of the Baixo Vouga and Douro Regions

The sub-region NUT III of Baixo Vouga (from now on referred to as the region of Aveiro) is composed by 12 municipalities and is located in Central Portugal (NUT II Centro). It is limited at North by the NUTs III Grande Porto and Entre Douro e Vouga, East by Dão Lafões sub-region, South by Baixo Mondego and West by the Atlantic Ocean (Figure 6.1). It is highly polarised by the city of Aveiro. It covers an area of 1802 km^2 with 389.979 inhabitants and has a population density of 216,2 inhabitants per km^2 (INE, 2012).

The region is crossed from East to West by the Vouga River and it is mainly known by its estuary (Ria de Aveiro), which has a significant role in leisure and tourism, nautical sports, traditional activities (fishing and salt extraction), aquaculture and scientific research. The Ria de Aveiro, formed in the 16th century, has always influenced the regional economy and development, the industrial and agricultural activities and the landscape. The city of Aveiro, known as the

"Portuguese Venice" has several canals where the traditional boats, the "moliceiros" offer boat trips and paint the urban landscape.

Figure 6.1– Location and municipalities of the NUT III Baixo Vouga

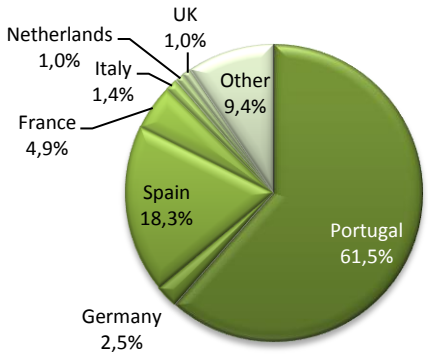
Source: own construction

Besides the canals and the river, the region has significant features attracting tourists, namely the beaches of Barra, Costa Nova, Torreira and Furadouro that provide important condition for the practice of water sports; the regional gastronomy with the traditional sweet "ovos moles" and several dishes made of fresh fish and sea food such as the "cataplanas" (traditional stew) and the famous "leitão da Bairrada" (roasted suckling pig); the SPAs/boiling springs; diverse cultural heritage and activities; rural and natural areas. The main tourism products are sun and sea, meetings industry, nature tourism, touring, short-breaks and nautical tourism.

The economy of the region is mainly characterised by heavy industry (such as paper, ceramics, energy, agroindustry, communication and information technologies and automobiles). Within the services sector, tourism is well developed, as well as education, especially due to the University of Aveiro, which has a central role in regional development (Associação Industrial Portuguesa [AIP], 2010a).

In what concerns the tourism industry, the region of Aveiro has a total of 65 hotel establishments with a lodging capacity of 5.165 beds and 10 rural tourism houses. In 2011, the region registered a total of 467.871 nights spent by 269.109 guests (INE, 2012). The seasonality ratio is of 39,1%, slightly below the country average of 40%. The average length of stay is very low, of 1,7 nights, although foreign guests register an average stay of 2 nights. The net bed-occupation rate is also presents a low performance, as only 26,3% of all beds were occupied in 2011, which is significantly below the national average of 40%.

Figure 6.2 – Nights spent in hotel establishments of Aveiro region by country of usual residency in 2011 (%)

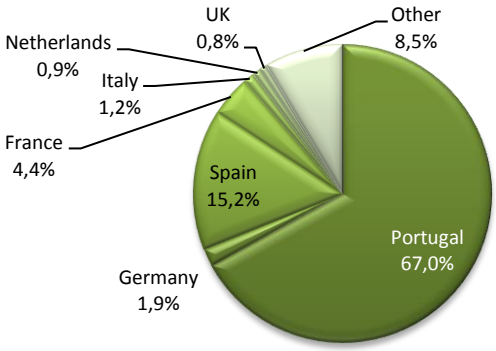


Source: INE, 2012

The main markets of the region of Aveiro (nights spent) are the Portuguese, accounting for an overwhelming 61,5% of the total, followed by Spain (18,3%). Together, these markets represent 80% of total. France (5%), Germany (2,5%) and Italy (1,4) are markets with a more reduced expression, but with potential for growth, especially if the average length of stay is lingered. Most bed nights are spent in the municipalities of Aveiro (41%), Mealhada (13,8%) and Anadia (13,2%) (Figure 6.2).

In terms of guests, the main markets are the same. However, the importance of the domestic market is even more significant, as it stands for 67% of total. Spain registered 15,2%, followed by France (4,4%) and Germany (2%). Foreign markets reduced their relevance in what concerns this indicators, when compared to the nights spent (Figure 6.3).

Figure 6.3 – Guests in hotel establishments of Aveiro region by country of usual residency in 2011 (%)



Source: INE, 2012

The NUT III Douro comprises 19 municipalities from Northern Portugal. It is limited at North by Alto Trás-os-Montes subregion, at East by Spain, at South by Beira Interior Norte and Dão Lafões and West by Tâmega subregions, as depicted in figure 6.4. It has an area of 4108 km^2, inhabited by 204.543 people. The population density is of 49,8 inhabitants per km^2, significantly lower than Aveiro, but characteristic of the rural areas that comprise the majority of this territory (INE, 2012).

Figure 6.4– Location and municipalities of the NUT III Douro

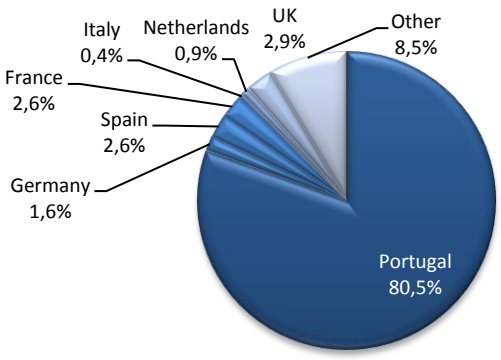
Source: own construction

The axis composed by Vila Real-Régua-Lamego is the most important in terms of population and in the configuration of the subregional urban system. However, the overall region has been going through a process of demographic recession, as it has been registering a negative population growth, alongside the continued ageing of its inhabitants (Associação Industrial Portuguesa [AIP], 2010b). In what concerns the main economic activities, it is worth referring that industry has a reduced importance in the productive structure of this subregion. In terms of employment and economic fabric, the agriculture masters the markedly rural space. The viniculture stands out, especially in the Douro Demarcated Region which produces Porto Wine and DOC wines. Other activities such as cattle breeding and tourism are also significant sources of income (AIP, 2010b).

Tourism in Douro is highly associated to the Douro River and wine tourism. The region is well endowed with a vast and rich cultural and natural heritage, of which the Douro River is the main player and the basis of regional economy, culture and traditions. The Douro Demarcated Region is the world's oldest, formally created in 1756. In 2001, the inscription of Alto Douro Wine Region as World Heritage has definitely confirmed the relevance of this territory and attracted the attention of many tourists worldwide. Its landscape represents a variety of activities related to winemaking, such as terraces, wine producing farm complexes (*quintas*), villages, chapels and roads (UNESCO, 2011). Tourists that arrive at Douro engage in wine-related activities, but also in water sports, gastronomy, nature and adventure tourism, history, cultural and archaeological heritage (Comissão de Coordenação e Desenvolvimento da Região Norte [CCDR-N], 2008).

In 2011, there were a total of 39 hotel establishments with 2.466 beds, and 68 rural tourism houses, which confirms the importance of rurality in Douro. The hotel establishments registered a total of 142.488 guests and 220.116 nights spent. The seasonality ratio is of 39%, close to the national average. The net bed-occupation rate of 29,3% is low, but slightly higher than Aveiro. However, it is still far below than the one registered for Portugal (40%). The average stay is of 1,5 nights, indicating that there is a weak dynamic in the fixation of tourists, namely through events and recreation activities.

Figure 6.5 – Nights spent in hotel establishments of Douro region by country of usual residency in 2011 (%)

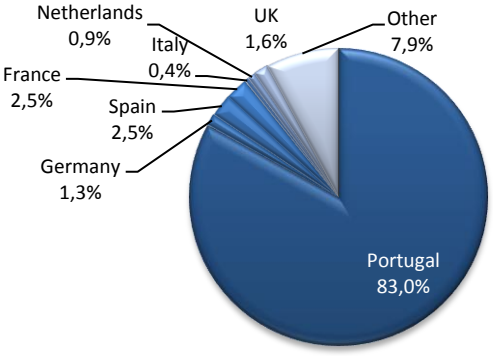


Source: INE, 2012

The Portuguese market is the most relevant, whether in nights spent and in guest, representing, respectively, 80,5% and 83% of total (Figures 6.5 and 6.6).

Similarly to Aveiro, Spain, France and Germany are the foreign markets that stand out, although with a significantly lower expression. The nights spent by tourists from these three countries account for only 6,8% of total, while in number of guests they do not overcome the 6,3%.

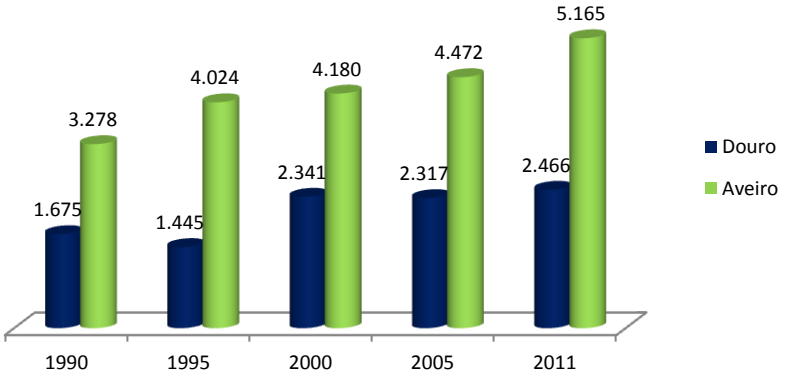
Figure 6.6 – Guests in hotel establishments of Douro region by country of usual residency in 2011 (%)



Source: INE, 2012

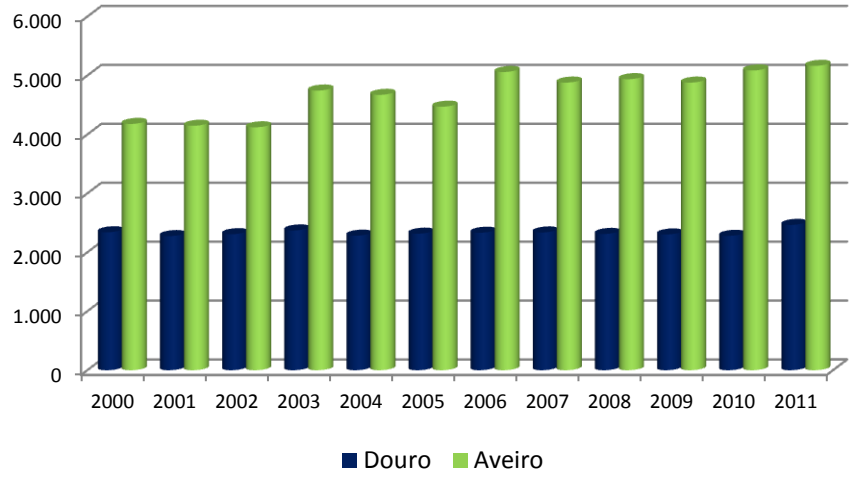
When comparing the tourism industry in both regions, it is observable that they present distinct patterns in terms of products, demand, supply and stage of development. Aveiro has started its development long before Douro. In the early 1960s, it was the third most important Portuguese destination in terms of hotel establishments, representing 7,5% of the country's lodging capacity, only surpassed by Lisboa and Porto (INE, 1970). The lodging capacity of the 12 municipalities that comprise the region of Aveiro is the double of the one registered by the establishments of Douro in 2011 (Figures 6.7 and 6.8).

Figure 6.7– Evolution of lodging capacity (number of beds) of Douro and Aveiro (1990/2011)



Source: INE, 2012

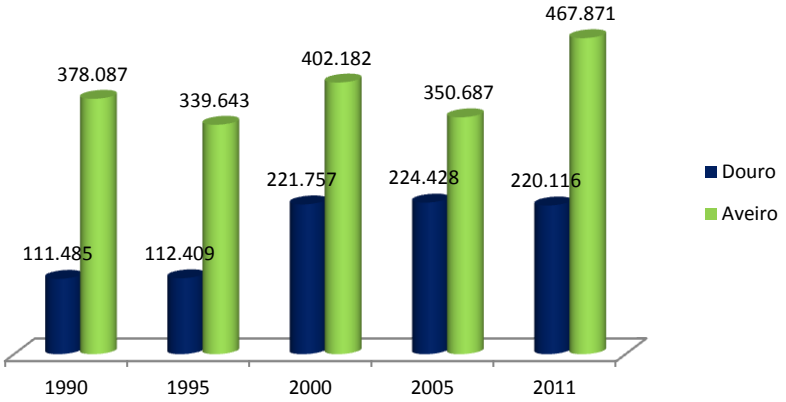
Figure 6.8– Evolution of lodging capacity (number of beds) of Douro and Aveiro (2000/2011)



Source: INE, 2012

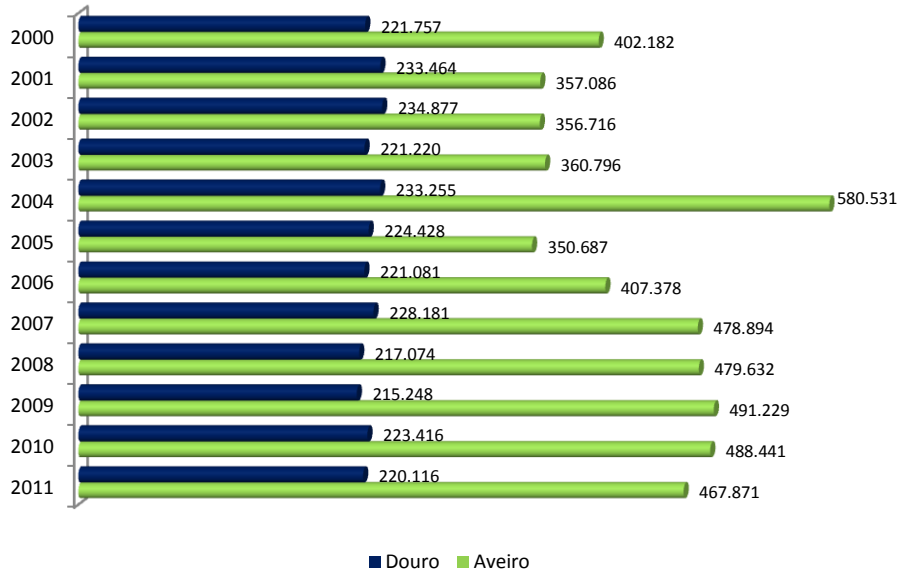
The numbers of guests and nights spent in both regions are presented in Figures 6.9 and 6.10. It is also easy to conclude that tourism is more significant and more developed in Aveiro, also due to the values that double those registered in Douro. Aveiro is close to reaching half a million overnights, while the region of Douro only records 220.116. Furthermore, while Aveiro (with a few oscillations in some years) has been growing since the year 2000, Douro maintains similar values in overnights and guests, not revealing a significant growth of tourism industry.

Figure 6.9 – Evolution of nights spent in the establishments of Douro and Aveiro (1990/2011)



Source: INE, 2012

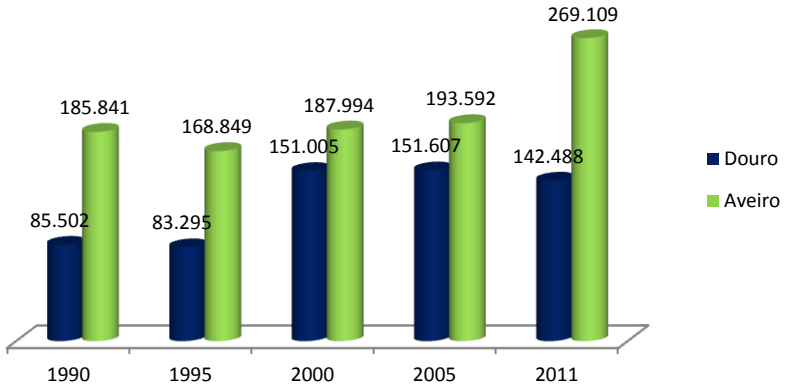
Figure 6.10 – Evolution of nights spent in the establishments of Douro and Aveiro (2000/2011)



Source: INE, 2012

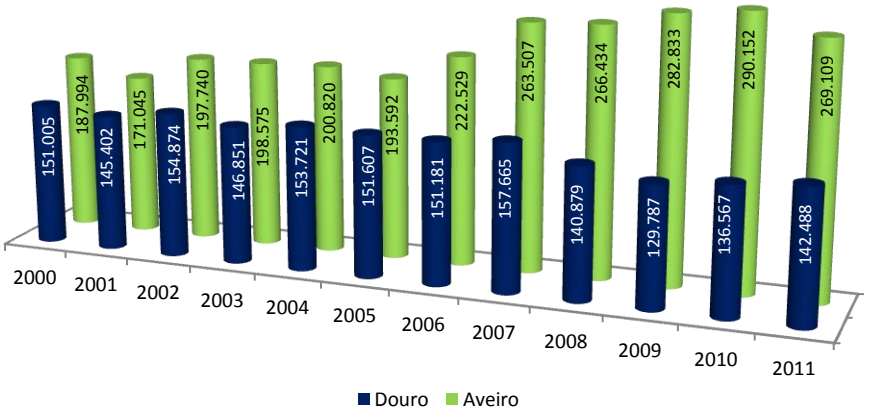
The recent decrease in these indicators may be explained by the economic crisis in Portugal that obviously affects the number of individuals that spend their holidays away from their usual environment. Moreover, the Spanish market was also affected not only by the crisis, but with the introduction of tolls in highways linking Spain to Aveiro that were previously free of charge, which caused a decrease in the number of Spanish tourists in the destination.

Figure 6.11 – Evolution of the number of guests in the establishments of Douro and Aveiro (1990/2011)



Source: INE, 2012

Figure 6.12 – Evolution of the number of guests in the establishments of Douro and Aveiro (2000/2011)



Source: INE, 2012

6.3 Analysis of regional innovation developed by tourism firms

As explained in the chapter 5, data regarding tourism firms was collected by survey. This survey was applied to the selected tourism firms, according to the methodology and criteria defined in section 5.3.4.7. As mentioned, the category of tourism firms that this study aimed at comply with those considered as tourism characteristic activities (UNSD et al., 2008), and are: (i) accommodation; (ii) food and beverage; (iii) passenger transport services; (iv) transport equipment rental; (v) travel agencies; (vi) cultural services; and (vii) recreation and leisure services.

In the end of data collection, a total of 79 online and 127 telephone surveys were accounted for, respectively 38,3% and 61,7%, in a total of 206 valid responses. When comparing both regions, it was possible to conclude that firms located in Douro were more open to the online survey completion than those located in Aveiro (Figure 6.13).

Figure 6.13– Online survey vs. Phone survey, by region

Source: own construction

The survey applied to tourism firms was organised according to a set of themes considered relevant for the analysis and assessment of regional innovation systems in tourism destinations, and to comply with the objectives and hypothesis of this thesis (see chapter 5, section 5.3.3). The survey is divided in six parts (Table 6.1), matching the subsequent data analysis.

Table 6.1 – Survey's sections, questions and objectives

Sections	Questions and Objectives
PART I – Innovation Performance [*Section 6.3.2*]	To analyse the innovation activities carried out by tourism firms and to characterise their innovation outputs, using questions aimed at unveiling: the types of tourism innovations introduced (QI.1), the level of novelty (QI.1.1), the % of innovations developed in cooperation (QI.2), the % of sales resulting from innovations (QI.3), the % of sales resulting from innovations developed in cooperation (QI.4) and the engagement in activities supporting innovation (QI.5)
PART II – Innovation Networks [*Section 6.3.3*]	The objective is to analyse the engagement in tourism innovation networks (QII.1) and to characterise the patterns of these networks in terms of organisations with which firms cooperated (QII.2), their geographical scope (QII.3), the frequency of contact (QII.4), the purpose of cooperation within innovation activities (QII.5) and the importance of different types of organisations for regional tourism innovation (QII.6).
PART III – Regional Knowledge [*Section 6.3.4*]	To identify the role of regional knowledge infrastructure in tourism innovation and the embeddedness of regional knowledge, considering the origin of the human resources hired by tourism firms (QIII.1), the main sources of knowledge (QIII.2) and the most important knowledge source in terms of geographical location (QIII.3).
PART IV – Regional Features [*Section 6.3.5*]	To understand the level of embeddedness of tourism innovation by assessing the importance of regional specific factors (QIV.1) and which actors usually introduce innovation in tourism in the respective region (QIV.2).
PART V – Perception on Innovation Environment [*Section 6.3.6*]	The objective is to gather information on the perception of tourism firms regarding the region's overall conditions to innovate (QV.3), the relation between regional networks and tourism innovation (QV.1, QV.2, QV.4, QV.5, QV.9) and the role of innovation in the destination development (QV.6, QV.7, QV.8).
PART VI – General Information [*Section 6.3.1*]	To characterize the profile of tourism firms, in terms of the following variables: location/municipality (QVI.2), number of employees (QVI.3), type of firm by tourism sub-sector(QVI.4), age (QVI.5), level of education of employees (QVI.6) and number of employees with a tourism degree (QVI. 7).

6.3.1 Characteristics of respondents

After the data collection process, 206 valid surveys were registered, out of which 109 were from firms located in the region of Douro (representing 57,4% of total responses) and 97, in Aveiro (50,8% of responses). This number represents an overall response rate of 54,1% of target population, as demonstrated in table 6.2.

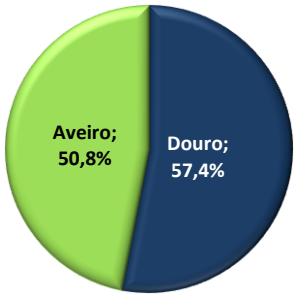
Table 6.2 – Survey population and response rate, by region

	Douro	Aveiro	Total
Population	190	191	381
Nr. of responses	**109**	**97**	**206**
Response rate	57,4%	50,8%	54,1%

Source: own construction

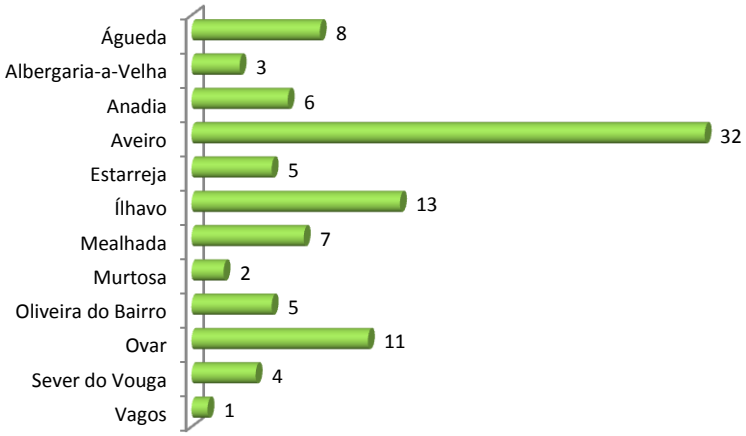
The distribution of the valid surveys by the 12 municipalities that comprise the NUT III Baixo Vouga (region of Aveiro) is presented in Figure 6.15. Most of the surveys were collected from firms located in the municipality of Aveiro, as it polarises tourism supply and demand in the region and thus has a higher number of tourism firms. Out of the 97 surveys, those collected in Aveiro represent 33% of the total. Ílhavo and Ovar, two municipalities with a strong relation to the estuary and with highly appreciated beaches represent, respectively, 13,4% and 11,3%. These 3 cities are the most relevant in terms of tourism dynamics. The surveys filled by firms located in the remaining 9 municipalities reach about 42% of total.

Figure 6.14 – Percentage of surveyed tourism firms, by region



Source: own construction

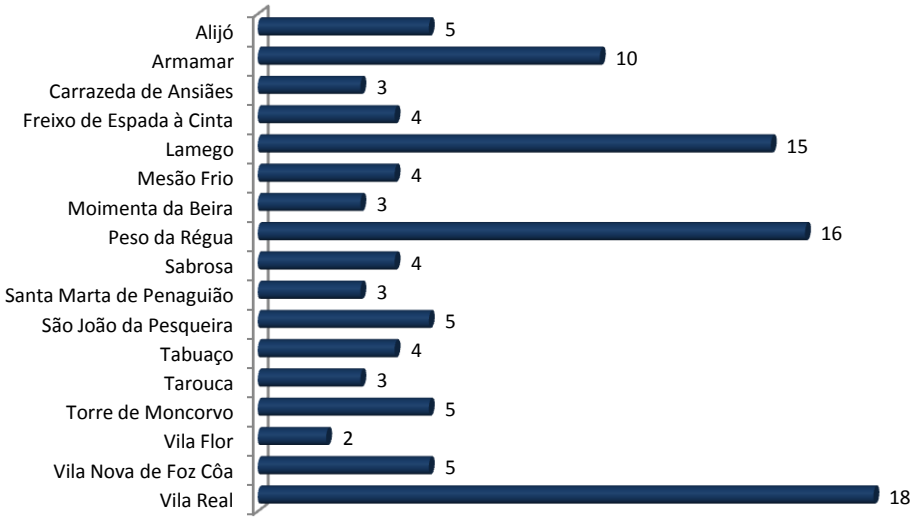
Figure 6.15 – Number of surveyed tourism firms, by municipality (Aveiro)



Source: own construction

In the region of Douro, out of the 109 surveys, the majority were collected in Vila Real (16,5%), Peso da Régua (14,7%), Lamego (13,8%) and Armamar (10,9%). The remaining 44% are equally distributed by the other 13 municipalities (Figure 6.16).

Figure 6.16 – Number of surveyed tourism firms, by municipality (Douro)



Source: own construction

6.3.1.1 Type of tourism firms

Considering the overall firms surveyed, accommodation businesses represent 35,9% of all typologies, which complies with the structure of tourism industry in both regions, where accommodation businesses amount nearly 31% of the total. These are followed by restaurants, with 55 valid responses (26,7%), recreation activities (13,1%), cultural activities (12,6%) and travel agencies or tour operators (10,7%). Transportation and rent-a-car register a lower response rate, due to two main reasons: in the first case, there are not many transportation firms related to tourism located in the analysed regions, for instance, firms that offer cruises in Douro have their head offices located in Porto. In the case of rent-a-car companies, it was found that they not consider themselves as an important part of tourism industry and therefore either considered that the survey did not apply to their operations or refused to answer. This may be explained by the fact that they work mainly with clients who need replacement cars or similar situations, and

not with tourists. If this survey was carried out, for instance, in Algarve, the situation would eventually be different.

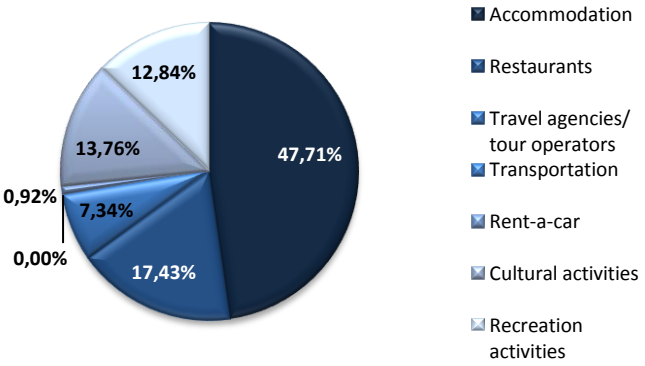
Table 6.3 – Surveyed firms by category and region

	Overall		Douro		Aveiro	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Accommodation	74	35,9%	52	47,7%	22	22,7%
Restaurants	55	26,7%	19	17,4%	36	37,1%
Travel Agencies/ Tour Operators	22	10,7%	8	7,3%	14	14,4%
Transportation	1	0,5%	0	0%	1	1,0%
Rent-a-car	1	0,5%	1	0,9%	0	0%
Cultural activities	26	12,6%	15	13,8%	11	11,3%
Recreation activities	27	13,1%	14	12,8%	13	13,4%
Total	**206**	**100,0%**	**109**	**100%**	**97**	**100%**

Source: own construction

In Douro, 52 valid surveys were registered in accommodation businesses. This value more than doubles the one regarding the accommodation firms in Aveiro. This happens due to the fact that in the Douro region, there are 83 lodging businesses that fit in the criteria defined to select the population, while in Aveiro only 34 units were selected as part of the population. Douro also registers a high number of rural tourism houses that, despite their small dimension in terms of number of rooms and beds, increase the number of accommodation units. In Douro, these typology of firms nearly reaches half of surveyed units (47,8%), while in Aveiro this number rests in 22,7%.

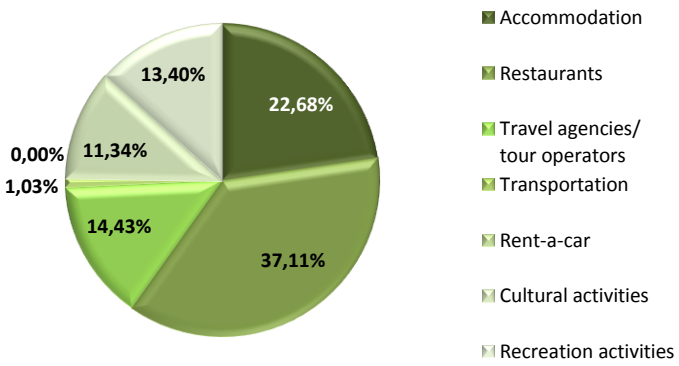
Figure 6.17 – Respondents in Douro, by tourism sub-sector



Source: own construction

Restaurants present the opposite situation. In Douro, they represent 17,4% of firms (19 units) and in Aveiro, 37,1% (corresponding to 36 units). This is in accordance with the selected population, as only 33 restaurants were considered for analysis in Douro and 50 in Aveiro.

Figure 6.18 – Respondents in Aveiro, by tourism sub-sector



Source: own construction

In both cases, accommodation and restaurants account for more than half of the firms, being this value more significant in Douro (65,1%) than in Aveiro (59,8%).

Travel agencies and tour operators present a distinct reality between both regions. In Douro, only 11 firms are registered in this category and effectively operating in tourism and in Aveiro, was possible to select 34 firms within this typology. For this reason, in Aveiro 14 firms were surveyed (representing 14,4% of total responses) and in Douro only 8 agreed to complete the survey, in a total of 7,3% of total units in this region.

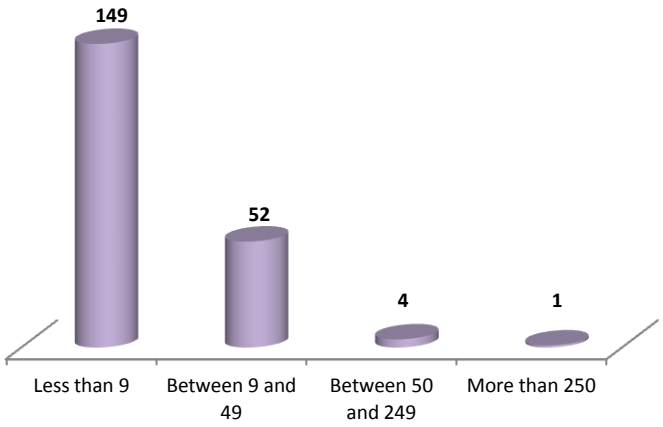
Cultural and recreation activities present a similar distribution between both regions. Together, they total 26,6% of Douro's firms (29 units) and 24,7% of Aveiro's (26 units).

6.3.1.2 Size of firms

The size of tourism organisations may influence their innovation performance. As seen in chapter 3 there are empirical studies confirming that, according to Schumpeter's (1934) findings, large tourism firms innovate more than tourism small and medium-sized enterprises (e.g. Jacob et. al,

2009, Sundbo et. al, 2007). Respondent firms were clustered in four different groups (international classification of SMEs), according to their number of employees (Figure 6.19).

Figure 6.19 – Size of tourism firms (by number of employees)



Source: own construction

The majority of firms have less than nine employees (72,3%), followed by those which employ between nine and forty nine people (25,2%). This scenario is similar to the one observed in the overall tourism industry in Portugal, where the vast majority of firms – an overwhelming 96,7%, are micro-firms (less than nine employees)[26]. This uneven distribution provides important information on the structure of tourism industry, composed mainly by small businesses, but hampers the comparability among firms in what regards the survey's results. For this reason, it was decided not to use this as an independent variable, as it would certainly bias the results.

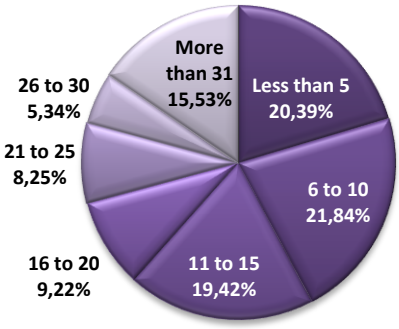
6.3.1.3 Age distribution

In what concerns the age of tourism firms, it is worth noting that new businesses, with less than five years, account for 20,4%, followed by firms with six to ten years of age (21,8%). Both these groups represent nearly half of the total firms. This may indicate an interesting recent dynamic of the tourism industry in the creation of new businesses (Figure 6.20). When comparing both

[26] Estimated data, based on number of firms of INE (National Statistics Office) (INE, 2009), according to the guidelines of United Nations World Tourism Organisation on Tourism Satellite Account regarding NACE codes of tourism characteristic activities (UNWTO, 2007).

regions, there is a similar distribution among the different groups, with the exception of firms aged between eleven and fifteen years, where Douro has more than double the firms than Aveiro, and in the firms with more than thirty one years old, where the larger difference exists: Aveiro accounts for twenty six firms, and Douro only for six (Figure 6.21).

Figure 6.20 – Overall number of firms, by age group

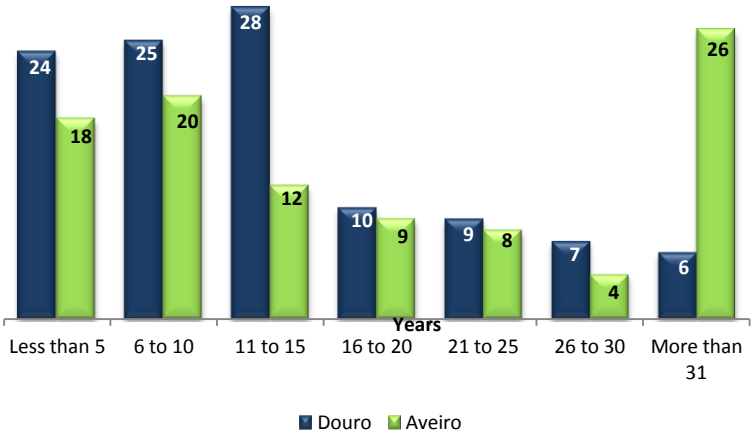


Source: own construction

The overall average age of the surveyed firms is of 17,7 years. Douro's average is of 13,6 years and Aveiro's is of 22,3 years. Firms located in Douro are, in average, younger than those located in Aveiro, which can be explained by the fact that that region has experienced tourism development more recently than Aveiro, and that it has currently an interesting dynamic in terms of recent investment in new tourism firms. One may refer the efforts made by Portuguese government in promoting and developing Douro as a tourism destination. In order to achieve it, the "*Vale do Douro Tourism Development Plan*" was launched in 2004, creating a significant framework for investment in tourism facilities, products and equipments, which contributed to the increase in tourism supply.

On the other hand, the existence of a high proportion of older tourism firms in Aveiro is due to the fact that this region has a longer tradition as a tourism destination. In fact, as mentioned, in the early 1960s, the region of Aveiro was the third most important Portuguese destination in terms of tourism supply, representing 7,5% of the country's lodging capacity, only surpassed by Lisboa (29,9%) and Porto (8,1%) at that time (INE, 1970).

Figure 6.21 – Age of tourism firms



Overall Average:	17,7 years	**Std. Deviation Overall:**	17,62
Average Douro:	13,6 years	**Std. Deviation Douro:**	12,54
Average Aveiro:	22,3 years	**Std. Deviation Aveiro:**	21,12

Source: own construction

6.3.1.4 Employees' education degree

An important issue to consider when analysing innovation regards the educational level of human resources. As mentioned before, the absorptive capacity, the skills to create and utilize new knowledge and subsequently the innovation performance of firms are highly constrained by the level of education of employees. Firms were asked to indicate the percentage of employees with the three different degrees (primary, secondary and tertiary). In relation to higher education (tertiary), it is relevant to highlight that 25,7% (48) of tourism firms do not employ anyone with this degree. Out of these 48 firms, 28 are located in Aveiro and 20 in Douro. It is also worth referring that there are nineteen organisations where all employees are graduated. Again, Douro overcomes Aveiro, accounting for sixteen of them.

Table 6.4 – Employees' education degree

Employees	Primary		Secondary		Tertiary	
	N	%	N	%	N	%
0%	94	51,4%	37	19,8%	48	25,7%
1-20%	21	11,5%	21	11,2%	28	15,0%
21-40%	23	12,6%	38	20,3%	41	21,9%
41-60%	21	11,5%	42	22,5%	35	18,7%
61-80%	6	3,3%	25	13,4%	15	8,0%
81-100%	18	9,8%	24	12,8%	20	10,7%
Total	**183**	100%	**187**	100%	**187**	100%

Source: own construction

Missing: 23; 19; 19

In order to better understand and analyse this data and compare it with other information, a new variable was created: the level of education. The objective was to classify firms according to the majority of employees with the different degrees. To do so, five categories were created, with the following criteria:

- **Low**: employees with primary education are more than 75% of total;
- **Medium/ low**: employees with primary and secondary education amounts 75%; number of employees with primary education is higher than 25%;
- **Medium**: employees with secondary education are more than 75%; values are equally distributed among the three levels;
- **Medium/ high**: sum of employees with secondary and tertiary education is higher than 75%; number of employees with tertiary education is over 25%;
- **High**: number of employees with tertiary education is over 75%.

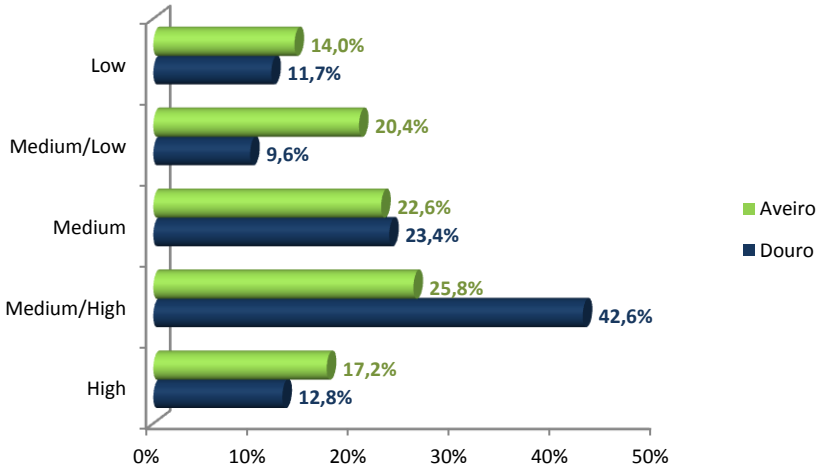
Table 6.5 – Overall level of education

	Frequency	%	Cumulative %
Low	24	12,8%	12,8%
Medium/Low	28	15,0%	27,8%
Medium	43	23,0%	50,8%
Medium/High	64	34,2%	85,0%
High	28	15,0%	100%
Total	187	100%	

Source: own construction

The overall scenario in terms of education level is balanced. About 51% of the firms are classified as low, medium/low or medium, which means that, in one half of firms, most employees have no more than secondary degree. The other half (about 49%) qualifies as medium/high or high, that is, most of human resources have a tertiary degree. Despite the fact that this does not represent the best situation for knowledge creation and innovation development, as the more qualified are the human resources, the higher is firms' innovative potential, it cannot also be synonymous of a disadvantageous position.

Figure 6.22 – Education level in Douro and Aveiro (%)



Source: own construction

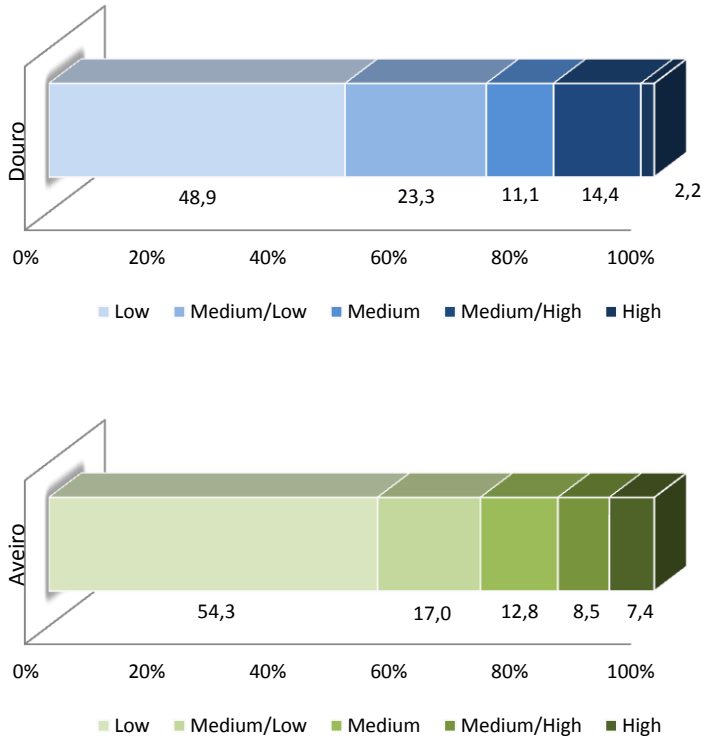
Despite the balanced distribution of educational level among surveyed tourism firms, some differences may be pinpointed between the two regions under analysis. Aveiro accounts for more firms classified as low or medium/low, which amounts to 34,4% of Aveiro's tourism firms, against 21,3% in Douro. Medium level firms do not present significant differences. In higher levels, it is worth noting that there are more firms classified as having medium/high and high education levels in Douro (55,4%) than in Aveiro (43%) (Figure 6.22). Overall, it can be assumed that tourism firms located in Douro are endowed with more qualified and educated human resources. As referred, this may be a positive influence in knowledge creation, absorptive capacity and innovation development.

6.3.1.5 Education in tourism

Human resources in tourism firms having or not a tourism degree highly influences the creation of knowledge on regional tourism industry, as well as the absorption and use of diffused knowledge and, consequently, innovation. It may also influence the establishment of formal or informal networks with other tourism actors in and outside the region. Similarly to the variable educational level, a scale was also created, where firms are classified under the following levels when employees with a tourism degree:

- **Low**: represent from 0 to 20% of total employees;
- **Medium/ low**: account for 21% to 40% of total employees;
- **Medium**: represent a share of 41 to 60% of total;
- **Medium/ high**: correspond to 61% to 80% of total employees;
- **High**: stand for 81% to 100% of total human resources.

Figure 6.23 – Level of human resources with tourism degree in Douro and Aveiro (%)



Source: own construction

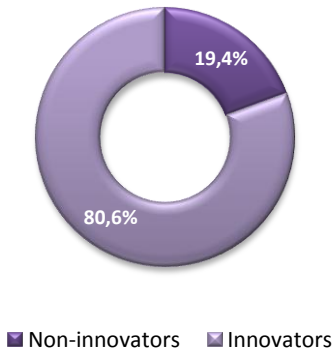
The overall results show that 67 (36,2%) of tourism firms do not have a single employee with a tourism degree. This value rises to 38,5% in Douro and 34% in Aveiro. Only in 7 organisations all human resources have background in tourism. Out of this, 5 are located in the Aveiro region. The overall picture is that in a few 30 firms (16,2%) more than 60% of their employees are trained in tourism. This trend is followed when analysing both regions individually.

As observed in Figure 6.23, the percentage of firms classified as low (less than 20% of human resources have a tourism degree) is very close to 50% in both cases. The sum of the categories medium/high and high is also similar (around 16%). One might highlight the difference observed in the category high, where Aveiro reaches 7,4% and Douro registers only 2,2% (7 firms against 2).

6.3.2 Innovation performance

This section aims at characterising the performance of tourism firms regarding innovation. The Community Innovation Survey and several authors consider service firms in general and tourism firms in particular as low innovators, and a significant share as no innovative at all. Bearing this in mind, the main objective is to conclude if Portuguese tourism firms are developing innovations, their innovation level, which type of innovations are introduced and what activities and processes underlie them. A comparison between the regions of Douro and Aveiro is made, in order to subsequently understand if the innovation performance is dependent on the location of tourism firms.

Figure 6.24 – Overall percentage of innovative tourism firms



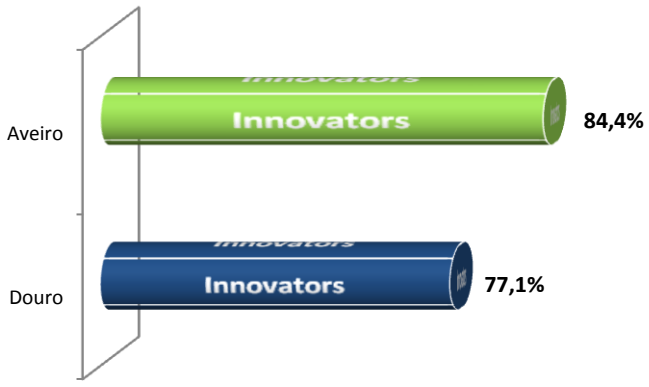
Source: own construction
Missing: 5

The first objective was to distinguish firms between **innovators** and **non-innovators**. Innovators are those who, in the last three years, introduced at least one type of innovation (product, process, organisational or marketing innovation). Non-innovators have not introduced any innovation.

When analysing aggregated data, it is concluded that 80,6% of tourism firms are innovators. This percentage corresponds to 162 firms, out of a total of 201 (5 of them did not know or did not answer the corresponding question). Only 39 firms are considered to be non-innovators (Figure 6.24). This rate clearly overcomes the one presented by the Portuguese Community Innovation Survey, where only 64% of the surveyed service firms presented innovation activities (GPEARI, 2010).

When comparing both regions, Aveiro registers 84,4% innovative tourism firms (corresponding to 81 units), exceeding Douro. Despite being a little lower, Douro presents a value of 77,1% (also for 81 firms). This depicts an extremely favourable scenario related to innovation dynamics of tourism organisations. From the overall surveyed units, only 24 firms (22,9%) in Douro and 15 (15,6%) in Aveiro did not develop any innovation if the past three years (Figure 6.25).

Figure 6.25 – Rate of innovative tourism firms in Douro and Aveiro (%)

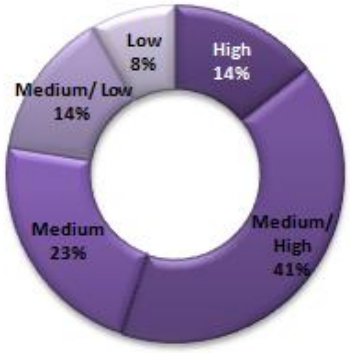


Source: own construction
Missing: 5

The existence of a relation of dependence between the variable "innovators" and the independent variables, measured by the application of the Pearson's chi-squared test (X^2) is only observable for the "type of organisation in Douro" (p=0,013; df=5; X^2=14,439) and in Aveiro (p=0,000; df=5; X^2=29,63), which means that the fact of the tourism firms being innovators

depends on the type of firm by tourism sub-sector in both regions. The Person's contingency coefficient (C), that measures the degree of association between the variables, is of 34,8% for Douro and 48,6% for Aveiro. Thus, the strength of the statistical relation is stronger in the later than in the former region.

Figure 6.26 – Rate of innovative tourism firms according to the employees' education degree



Source: own construction

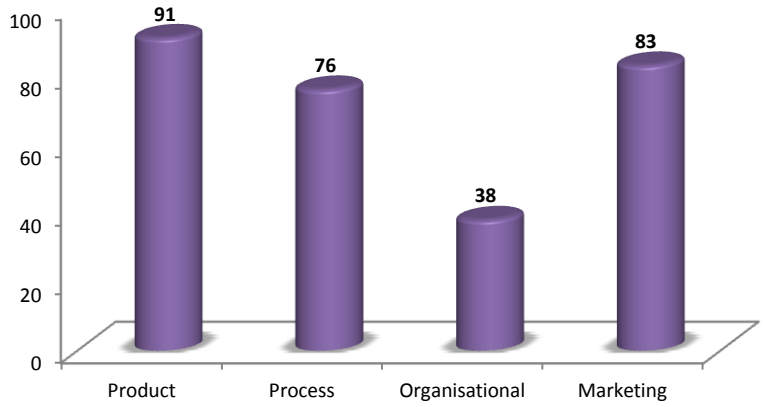
Out of the total of employees in innovative firms, 55% are classified as high or medium high in terms of their education, meaning that firms that innovate are characterised by employing human resources with higher education degrees. This is in accordance with the idea that people with an adequate educational background have increasing capacity to learn and assimilate external knowledge and transform it into innovation. It is a significant determinant of firms' internal ability to innovate.

The applied survey also intended to analyse which type of innovations were developed (question I.1, appendix 5). According to the Oslo Manual (OECD, 2005), in a definition that inherits Schumpeters' writings, innovation may be classified in four distinct types: product, process, organisational and marketing. These are defined in the following terms:

- **Product Innovation**: a new or significantly improved tourist good or service, regarding its characteristics or final use;
- **Process Innovation**: new or significantly improved production processes, distribution methods or activities that support tourist goods or services, including significant changes in techniques, equipments and/or software;

- **Organisational Innovation**: Implement a new organisational method in business practices, in workplace organisation or in firm's external relationships, regarding tourism affairs;
- **Marketing Innovation**: new marketing concept or strategy regarding tourism, different from the existent ones or already used by the organisation, considering product design or packaging, product placement, product promotion or pricing;

Figure 6.27 – Number of firms that introduced tourism innovations, according to innovation type



Source: own construction

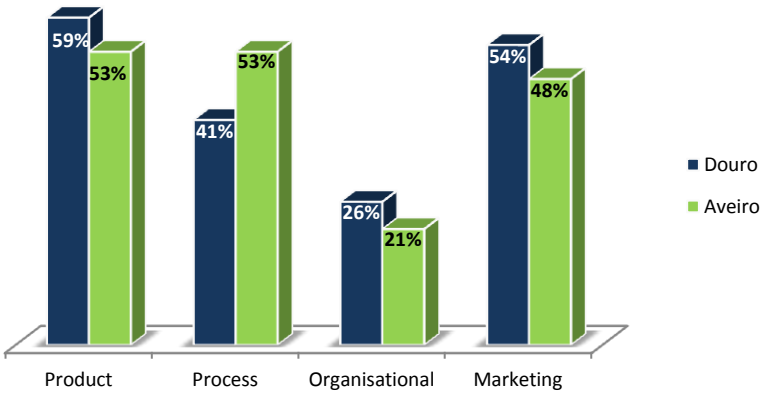
Despite the fact that some authors propose additional categories when considering innovation in tourism (for instance, Hjalager (1997, 2010) and Hjalager et. al (2008) also include the categories of institutional innovation, reverse community innovation and reverse business innovation), for the purpose of this research, it was considered the taxonomy proposed by the Oslo Manual and used in the Community Innovation Survey, for two main reasons: (i) it makes possible a future comparison among other business sectors and (ii) it is more adjusted to the objectives of this work.

As observed in figure 6.27, the product innovation is the typology that stands out: 91 tourism firms developed a new product in the last three years, which represents a rate of 56% of innovative firms. Marketing innovations are the second most popular, with 83 firms referring to have introduced some innovation under this typology (51,2%). Seventy six firms were engaged in process innovation activities (nearly 47%) and in a less significant position appears organisational

innovation, where only 38 organisations (23,4%) affirm to have been involved in such activities. The Pearson Chi-Squared test for independence (X^2) was applied in order to observe the relations between the variables. Thus, the four innovation types were crossed with all independent variables. The results unveil that there is a relation between the "process innovation" and the "region" (p=0,037; df=1; X^2=4,36), which means that the location of tourism firms (Douro or Aveiro) influences the introduction of process innovations, but not of product, organisational, or marketing innovations. Other associations were found, namely between product innovation and the age of firms located in Douro (p=0,03; df=6; X^2=13,95), product innovation and the type of firm by sub-sector from Douro (p=0,004; df=5; X^2=17,14). The type of firm located in Aveiro influences process innovation (p=0,010; df=5; X^2=15,14), organisational innovation (p=0,043; df=5; X^2=11,45) and marketing innovation (p=0,015; df=5; X^2=15,14).

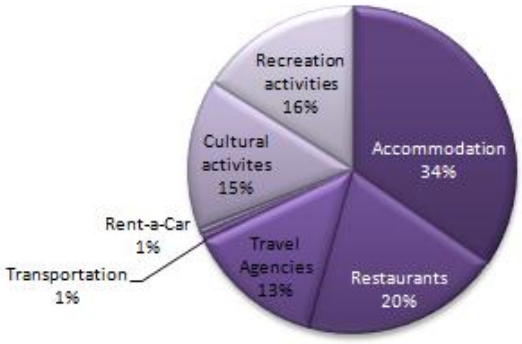
The analysis of both regions separately shows that, in every innovation typology, Douro registers a higher share of tourism firms engaged in those types of innovations (considering the total of innovative firms), although with a small difference towards the values presented for Aveiro (Figure 6.28). The exception lies in the discrepancy registered in process innovation, where Aveiro accounts for a higher value. This situation is not atypical: according to Utterback and Abernathy (1975), as destinations/ firms go further in their life cycle, they start developing process innovations, while those in the early stages of life cycle are more focused on product innovation. This is true if one considers that, after the consolidation and standardisation of products and services placed in the market, most businesses will then focus on improving quality and operations standards by developing innovations that optimise processes.

Figure 6.28– Share of firms that introduced tourism innovations in Douro and Aveiro



Source: own construction

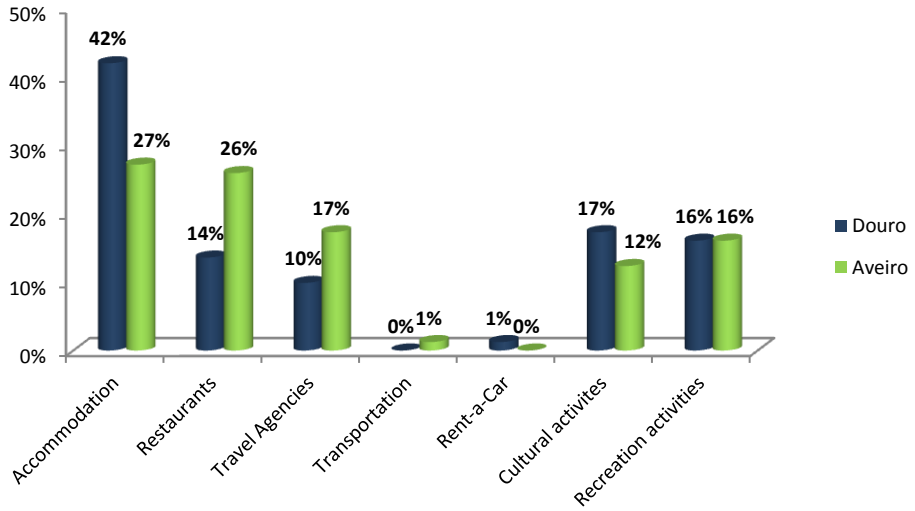
Figure 6.29 – Rate of innovative firms by tourism sub-sector



Source: own construction

When analysing the innovation performance of each tourism sub-sector (Figure 6.29), it is concluded that accommodation firms are the most innovative, with a rate of 34% of the total, followed by restaurants (20%) and recreation and cultural activities, both with a similar rate of 16% and 15% respectively. Travel agencies represent 13% of the total innovative firms, while transportation and rent-a-car have a minimal expression. It is interesting to note that cultural and leisure activities concentrate 31% of innovative organisations, which is very close to the accommodation units.

Figure 6.30 – Rate of innovative firms by tourism sub-sector in Douro and Aveiro



Source: own construction

If one considers both regions separately (Figure 6.30), some significant differences can be highlighted. In Douro, the accommodation sub-sector concentrates 42% of firms that innovate, followed by cultural (17%) and recreation activities (16%). Aveiro presents an interesting pattern, as both accommodation businesses and restaurants register a similar rate in terms of innovation, with 27% and 26%, respectively. Together, these sub-sectors concentrate more than half of the region's innovative firms. Travel agencies account for 17%, demonstrating to be more innovative in Aveiro than in Douro. Recreation activities also stand out with 16%, while cultural activities are less expressive than in Douro in terms of innovation development.

Table 6.6 – Rate of innovative firms by innovation type

	Product	Process	Organisational	Marketing
Accommodation	30%	34%	42%	41%
Restaurants	22%	14%	18%	17%
Travel Agencies	10%	17%	8%	10%
Transportation	1%	1%	0%	1%
Rent-a-Car	0%	0%	3%	0%
Cultural activities	16%	18%	11%	11%
Recreation activities	21%	14%	18%	20%
Total	100%	100%	100%	100%

Source: own construction

Product innovation is mainly developed by firms from the accommodation sub-sector, representing 30% of total, followed by restaurants (22%), recreation activities (21%) and cultural activities (16%). Within process innovation, accommodation continues to stand out with 34% of the total, alongside cultural activities (18%) and travel agencies (17%). In fact, it is in the process innovations that travel agencies appear to focus, which may be justified by the introduction of information and communication technologies in their operations. In organisational innovation, accommodation units represent nearly half of the total with 42%, followed by restaurants and recreation activities, each with 18%. In what concerns marketing innovations, the same subsectors stand out (Table 6.6).

When analysing the innovation patterns according to sub-sectors (Table 6.7), it is found that accommodation firms focus mainly on developing new marketing strategies (33%) followed by new products (26%) and new processes (25%). This is the sub-sector that registers a higher

response rate for marketing innovations. Restaurants concentrate most of their effort on creating and launching new products (38%). Transportation firms grant equal importance to product, process and marketing innovations, but do not engage in new organisational forms. Cultural and recreation activities are also mainly focused on developing new products. In the case of cultural sub-sector, product innovations are immediately followed by process innovations, while recreation firms grant a higher significance to new marketing strategies. Excluding the rent-a-car sub-sector, organisational innovations register the lowest response rates in all types of firms.

Table 6.7 – Rate of innovative firms by tourism sub-sector

	Accomm.	Restaurants	Travel Agencies	Transp.	Rent-a-Car	Cultural activities	Recreation activities
Product	26%	38%	27%	33%	0%	36%	35%
Process	25%	21%	39%	33%	0%	33%	20%
Organisational	16%	13%	9%	0%	100%	10%	13%
Marketing	33%	27%	24%	33%	0%	21%	31%
Total	100%	100%	100%	100%	100%	100%	100%

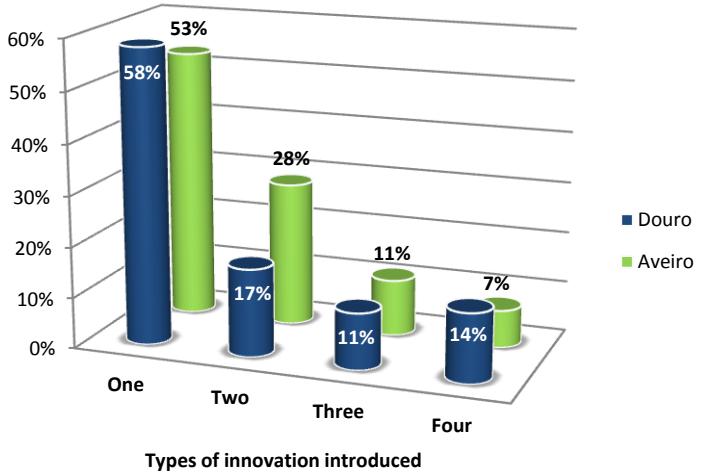
Source: own construction

In order to evaluate the innovation performance of tourism firms located in Douro and Aveiro, it is important to analyse their innovation intensity. The fact that firms could not indicate how many innovations they had developed in the last three years[27], which was observed during the pilot survey (chapter 5, section 5.3.4.5), prompted the development of an additional way of complementing the innovative performance assessment. The **innovation intensity** measures the level and diversity of innovations implemented by each firm, according to the four above mentioned innovation types. The scale ranges from 1 to 4, where 1 means that only one type of innovation was developed (therefore, a low innovation intensity exists), and 4 means that the firm introduced the four types of innovation in the previous three years, depicting a high intensity and diversity of innovations. The results are presented in figure 6.31. It shows that Douro has a higher percentage of low innovators than Aveiro, that is, firms that only introduced one type of innovation (respectively, 58% and 53%). More than half of the respondents have only placed one type of innovation in the market. Firms that introduced two types of innovators account for 28% in Aveiro and merely 17% in Douro. However, the rate of firms that are highly innovative, as they introduced a variety of innovations (regarding the four types) in Douro is the double of Aveiro

[27] The fact that, as seen in chapter 3, section 3.3, tourism innovations are frequently incremental, and therefore not being understood as innovation, contributes to this situation that is characteristic of services firms.

(14% against 7%). Overall, it may be concluded that the majority of tourism firms introduces one or two types of innovations, being uncommon to develop three or the four types.

Figure 6.31 – Innovation intensity



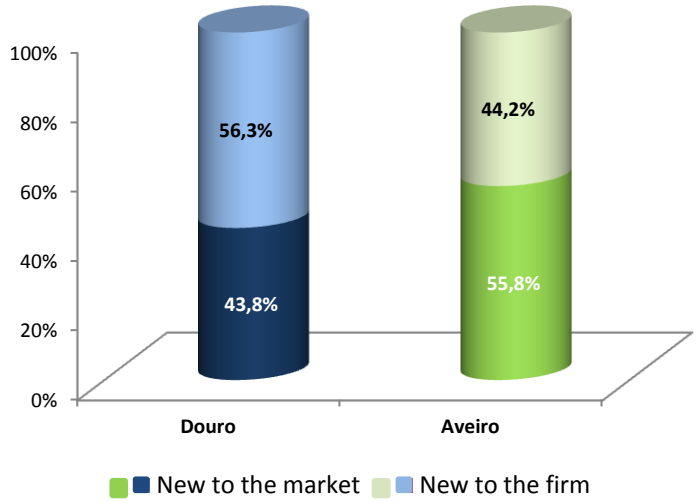
Source: own construction

One of the ways of characterising the degree of novelty of new products is to assess whether they are new to the market or new only to the firm. Thus, firms who claimed to have product (good or service) innovation were asked whether they were entirely new to the market or only to the organisation (question QI.1.1). This is important to be analysed, as it may unveil if the firm and/or the region are risk takers in what concerns the type of innovations developed. Innovations that are new only to the firm may indicate that those organisations are imitators or followers, and point towards more incremental innovations. Firms that develop products that are new to the market may promote a more entrepreneurial environment as well as resort to research and development and have more linkages to knowledge producers. It should be emphasised that these products are usually closer to more radical innovations.

However, the "new to the firm" situation, despite involving less risk or engagement in innovation activities as inputs, is an important process for an organisation, as it indicates the adoption of innovations and absorption of existing knowledge. This is important for innovation systems, as it

involves the creation, dissemination and the use of knowledge, which involves collective learning, emerging from relationships among the innovation system's organisations.

Figure 6.32 – Level of innovativeness of new products



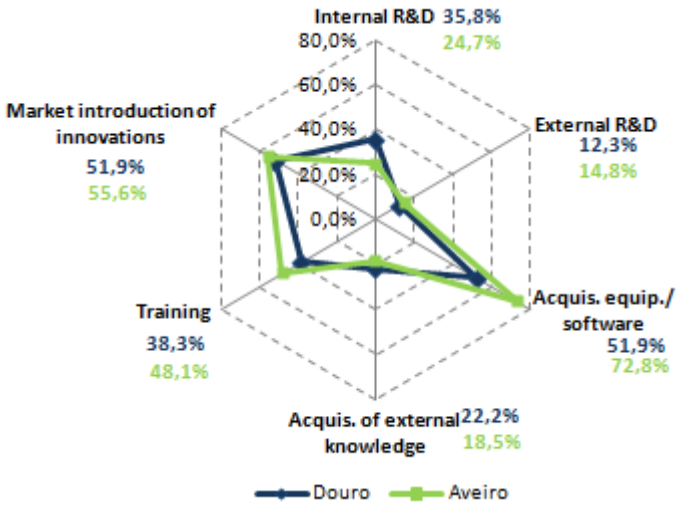
Source: own construction

There are a significant number of organisations whose product innovations were completely new to the market, out of those who stated to have developed product innovation. From the overall respondents, 49,5% introduced a novelty in the market. One might consider, therefore, that half of tourism firms assume the development of an entirely new product, which brings along increased investment in research, marketing and operations, as well as the risk of imitation, which may turn the innovation obsolete rather quickly. In addition to this, the fact that the vast majority are small and micro firms, then it is not wrong to assume that nearly half of tourism SME presents interesting dynamics in terms of innovation activities and in creating the determinants that foster innovation.

In the region of Aveiro, 55,8% of firms with product innovation affirm that these products are new to the market, while in Douro the majority of the firms (56,3%) introduced products that are only new to the firm. This distinction allows the segmentation of firms into two innovator categories. One may consider firms who introduced a new product to the market, which requires the creation of new knowledge, as **major innovators**. **Minor innovators** comprise firms that introduced innovations only new to the firm, based on already existing knowledge. It is then concluded that

the majority of tourism firms located in the region of Aveiro that introduced innovations in the last three years are major innovators, as the developed innovations rely on new knowledge. The 55,8% rate surpasses the region of Douro, where most tourism firms (56,3%) are minor innovators. The chi-squared independence test was applied to all independent variables (region, age of firms, type of firm by sub-sector, % of staff with university degree, % of staff with tourism degree). It was concluded that there are no statistically significant differences for the almost totality of variables. The exception is for the tourism sub-sector in Douro (p=0,003; df=4; χ^2=16,1). It may be concluded that there is a relation between the type of firm by sub-sector and if they are major or minor innovators.

Figure 6.33 – Innovation activities



Source: own construction

Innovation activities are "*all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations*" (OECD, 2005, p. 47). In order to identify the main inputs to the development of tourism innovations, the respondents selected the innovation activities undertaken by their firms from the items presented (question I.5). The results are shown in figure 6.33.

The "acquisition of equipment or software" is the main activity developed by tourism firms in order to implement innovation. Peters and Weiermair (2002, cit in Mayer, 2009) argue that the size of tourism firms also influences the type of innovation and innovative inputs. Due to their

small size, they are frequently limited to the acquisition of equipment and software with the aim of increasing internal capacities. If one adds the profile of surveyed firms (almost all of them are small, employing no more than 9 people) to these results, Peters and Weiermair's findings comply with ours. Aveiro registers the higher value in this item, with 59 of a total of 81 innovative firms (72,8%) involved in it. Douro also presents a significant value of 42 firms (51,9%). The "market introduction of innovations", appears as the second choice for Aveiro (55,6% of innovative firms) and equals the acquisition of equipment or software in Douro (51,9%). These two activities are the most selected by firms located in both regions. "Training for innovative activities" comes in third place. Human capital is increasingly acknowledged as a fundamental input for innovation, as it fosters knowledge creation, diffusion and utilisation and influences organisational competences and absorptive capacity. The activities related to Research and Development (R&D) present the lower level of responses. However, it is worth referring that the only activities where Douro's firms surpasses Aveiro is in "internal R&D" and "acquisition of external knowledge", which indicates that organisations located in Douro might be more engaged in research, scientific knowledge and knowledge producers as inputs for innovation, whether developed internally or acquired externally. Despite these results, as shown in figure 6.31, minor innovators (firms that innovate relying on existing knowledge) overcome the rate of major innovators.

Another level of analysis of innovation performance relates to the economic significance of innovations for firms, namely the ones developed in cooperation with other organisations. Thus, the surveyed firms were asked to provide the percentage of innovation developed in cooperation (question I.2), the percentage of sales corresponding to new products/ services (question I.3) and the percentage of sales represented by innovation developed in cooperation (question I.4). Responses were grouped into classes in order to favour the data analysis (Table 6.8).

As mentioned before, respondents were asked to provide an average of the share of **innovation developed in cooperation** with other organisations. Only 9 firms (8,2%) of respondent firms claim to have cooperated to developed from 81% to 100% of their innovations. Six of them (10,5%) are located in Aveiro and 3 (5,7%) in Douro. Out of this group, 8 firms stated that 100% of innovations resulted from formal or informal cooperation (5 from Aveiro and 3 from Douro). Despite the low absolute numbers, in relative terms, Aveiro has twice the number of firms that generated almost the totally of their innovation cooperating with other economic agents.

Table 6.8 – Innovation, cooperation and their economic significance

	Douro			Aveiro		
	Number of firms (ni)	% (fi)	Accum. % (Fi)	Number of firms (ni)	% (fi)	Accum. % (Fi)
% of innovation developed in cooperation						
0%	23	43,4%	43,4%	29	50,9%	50,9%
From 1% to 20%	8	15,1%	58,5%	5	8,8%	59,6%
From 21% to 40%	12	22,6%	81,1%	6	10,5%	70,2%
From 41% to 60%	5	9,4%	90,6%	6	10,5%	80,7%
From 61% to 80%	2	3,8%	94,3%	5	8,8%	89,5%
From 81% to 100%	3	5,7%	100%	6	10,5%	100%
Total	**53**	**100%**		**57**	**100%**	
Missing: 28 in Douro; 24 in Aveiro (DK/NA)						
% of sales resulting from innovation						
0%	4	10,0%	10,0%	7	16,3%	16,3%
From 1% to 20%	15	37,5%	47,5%	14	32,6%	48,8%
From 21% to 40%	7	17,5%	65,0%	7	16,3%	65,1%
From 41% to 60%	5	12,5%	77,5%	12	27,9%	93,0%
From 61% to 80%	5	12,5%	90,0%	2	4,7%	97,7%
From 81% to 100%	4	10%	100%	1	2,3%	100%
Total	**40**	**100%**		**43**	**100%**	
Missing: 41 in Douro; 38 in Aveiro (DK/NA)						
% of sales resulting from innovation developed in cooperation						
0%	13	34,2%	34,2%	17	43,6%	43,6%
From 1% to 20%	12	31,6%	65,8%	8	20,5%	64,10%
From 21% to 40%	4	10,5%	76,3%	4	10,3%	74,40%
From 41% to 60%	7	18,4%	94,70%	9	23,1%	97,50%
From 61% to 80%	2	5,3%	100%	1	2,6%	100%
From 81% to 100%	0	0%	100%	0	0%	100%
Total	**38**	**100%**		**39**	**100%**	
Missing: 43 in Douro; 42 in Aveiro (DK/NA)						

Source: own construction

On the other hand, the rate of firms that did not establish any cooperation in order to produce innovations is extremely significant. While Aveiro presents a more favourable situation than Douro in the higher level of innovations resulting from cooperation, here, the opposite is verified. While, in Douro, 43,4% of firms do not cooperate, in Aveiro this value rises up to 50,9%, which may indicate that the links established by Aveiro's firms are more effective.

If the other levels are added to this analysis, in order to get an overall picture, an interesting pattern is found: with the exception of the first level (regarding 0%), Aveiro presents a higher rate of innovations developed in cooperation in higher groups, that is, there is a total of about 30% of firms that developed between 41% to 100% of their innovations by cooperating with other organisations. By opposition, Douro only registers 18,9% in this interval, presenting more significant values in lower levels of cooperation. In average, 22,4% of tourism innovations in Douro are developed in cooperation and in Aveiro this value rises to 25,9%.

In order to assess if there are statistically significant differences in the responses, the Independent-Samples Kruskal-Wallis non-parametric test was used (due to the fact that the necessary conditions for the use of the One-Way ANOVA parametric alternative were not gathered). After applying the test to all independent variables, it was only found a statistically significant difference between the different types of firms located in Douro and the rate of innovation developed in cooperation (p=0,043; df=5; KW=11,457). Thus, the null hypothesis "the distribution of innovations developed in cooperation is the same across categories of type of organisation" can be rejected.

A second level of analysis intended to understand the economic significance of innovation for tourism firms, which also allows the evaluation of economic performance. For that matter, respondents were asked about the rate of **sales resulting from innovations** and **the rate of sales resulting from innovations developed in cooperation**.

The response rate to both these questions was low, as only about 50% of innovative firms from both regions answered. Most respondents were unable to provide a clear picture of the situation, and therefore were not able to give information on the economic value of innovation for their organisations. The majority of firms (35% of overall respondents) estimate that innovations represent between 1% and 20% of their sales. In Aveiro, this group is followed by those that place the rate of innovations in the global sales of the company between 41% and 60% (nearly 30% of firms), while in Douro, it is less representative, as only 12,5% of organisations fall in this group. However, Douro clearly overcomes Aveiro in the highest rate groups, as 12,5% and 10% of firms claim that the innovations produced represent, respectively, between 61% and 80%, and 81% and 100% of sales, against to only 4,7% and 2,3% in Aveiro. Moreover, from the 4 firms that refer that innovations are 100% of sales, 3 are located in Douro. It is also worth noting that there is a

representative number of firms whose new products and services have not been sold in the last three years (0% of total sales), namely 10% in Douro and 16,3% in Aveiro.

Again, the Kruskal-Wallis test was used to analyse the differences between groups. The outcome confirmed the above results: there is a statistically significant difference between the different types of firms located in Douro and the rate of sales resulting from innovations (p=0,015; df=4; KW=12,27), which means that there is an unequal distribution of sales resulting from innovations among the different types of organisations.

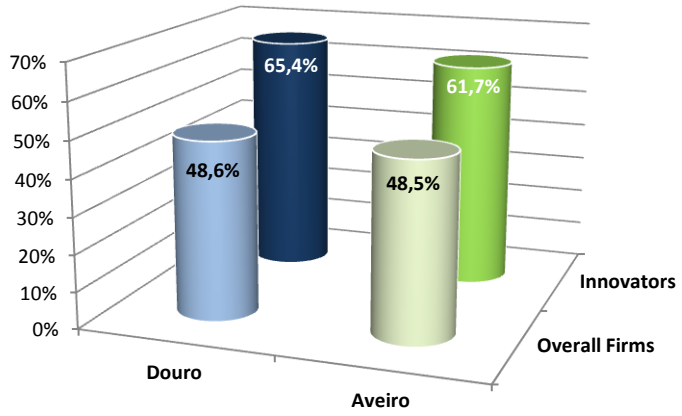
Finally, it was attempted to analyse the rate of **sales resulting from innovation developed in cooperation**. The figures presented in table 6.7 demonstrate that innovations developed in cooperation have a low economic value for both regions, as they represent a very small percentage of sales made in the last three years. The highest percentage of responses fall into the 0% group: 34,2% of firms in Douro and 43,6% in Aveiro claim that the innovations developed in cooperation did not bring any financial benefit to the company. The category from 81% to 100% does not register any response, and the immediately below group (61% to 80%) only comprises 2 firms in Douro and 1 in Aveiro. To summarise the results, 65,8% of firms located in Douro and 64,1% in Aveiro show that the percentage of sales of innovations developed in cooperation do not represent more than 20% of total.

In this case, the results from the application of the Kruskal-Wallis test show that the sales resulting from innovation developed in cooperation are unequally distributed among the different types of organisations located in Aveiro (p=0,01; df=4; KW=13,176).

6.3.3 Networking and cooperative behaviour towards tourism innovation

Innovation networks are considered to be the main booster of regional tourism innovation systems. Bearing this in mind, in this section the patterns of tourism innovation networks are characterised for the regions under analysis. The first issue to be considered is if tourism firms are in fact engaged in networks with the aim of developing joint innovations.

Figure 6.34 – Engagement in innovation networks



Source: own construction

The engagement in innovation networks informs on the number of firms that cooperated with any other organisation in the last three years in order to develop innovations (question II.1). In what concerns the overall respondents, both regions present a similar rate, around 48,5%. If the analysis is performed considering only the innovative firms, Douro registers a slightly higher rate than Aveiro, with 65,4% for the former and 61,7% for the later. In absolute numbers, this represents respectively 53 and 47 firms.

The Pearson's chi-squared test (χ^2) informs that there is a statistically significant association between the engagement in networks in order to develop tourism innovation and the sub-sector firm, both in Douro (p=0,002; df=5; χ^2=18,816) and Aveiro (p=0,000; df=5; χ^2=24,971). The Contingency Coefficient (C) demonstrates a stronger degree of association between the variables in the case of Aveiro (45,2%) than in Douro (38,4%). The relation between the engagement in networks and if the firms are innovators or non-innovators was also analysed. A statistically significant association was found (p=0,000; df=1; χ^2=46,040), which means that being part of a collaborative network aiming at developing innovation in travel and tourism industry influences if firms are innovative or not.

Following the identification of the number and the profile of firms that are involved in innovation networks, it is important to understand the patterns of collaboration within these networks. Therefore, the following analysis aims to characterise the innovation networks within innovation systems in terms of:

i. The **type of organisations** with which tourism firms cooperate;
ii. The **geographical scope** of cooperation;
iii. The **frequency of contact** among the involved organisations;
iv. The **purpose** of cooperation;
v. The **importance** of different types of organisations for regional tourism innovation.

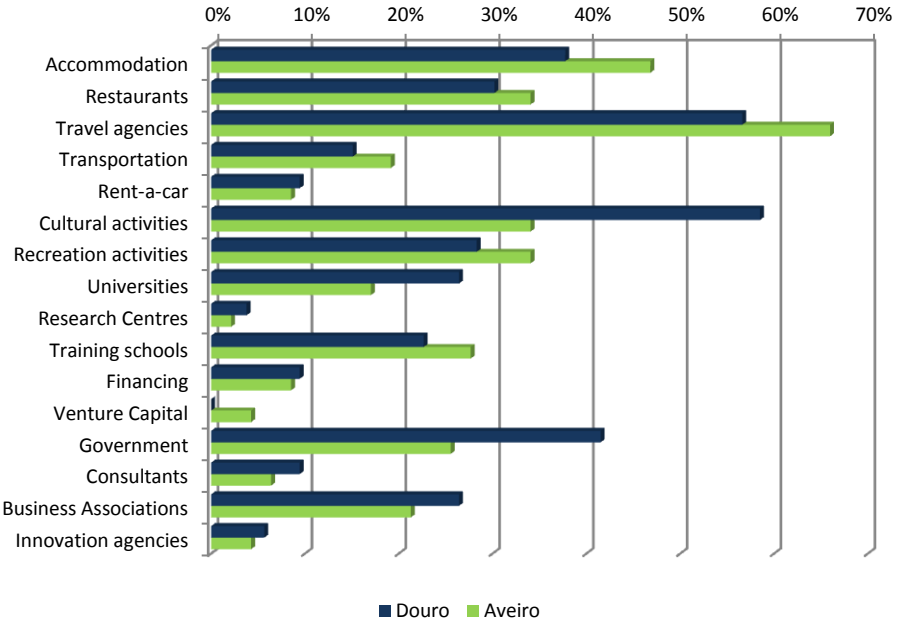
6.3.3.1 Organisations involved in tourism innovation networks

The literature review on the components and dynamics of regional innovation systems and of tourism systems provide important insights for the conceptualisation of the model of a regional tourism innovation system which, in turn, create the framework for the design of the survey. Subsequently, a set of sixteen types of organisations were identified as possible actors comprising regional innovation systems with the necessary adjustments to tourism system, namely in the definition of tourism characteristic activities, which was accomplished by applying the recommendations of UNWTO's Tourism Satellite Account (UNSD et al., 2008). In face of this list, the firms that claimed to be part of a tourism innovation network in the previous question were asked to identify the types of organisations with which they had cooperated in the last three years (question II.2).

Overall, the patterns presented by firms of both regions concerning their collaborators are similar. The highest rates are verified in collaboration with accommodation units (37,7% in Douro and 46,8% in Aveiro), travel agencies (56,6% and 66%), cultural activities (58,5% and 34%), recreation activities (28,3% and 34%) and restaurants (30,2% and 34%). That is, the cooperation is stronger within tourism firms/ activities than with non-firm organisations. Tourism-related business associations also emerge as important partners (26,4% and 21,3%). The organisations that present the lowest rates are venture capitalists, innovation agencies, research centres and consultants. This situation may indicate the presence of closed systems, in the sense that they do not establish significant cooperation links with organisations outside the tourism industry. In Douro, links with tourism firms represent 62% of total links, while with non-firm organisations is of 38%. In Aveiro, these values are of 67% and 33%, respectively, which indicates that the patterns of cooperation inside the industry are more pronounced in this region. Non-firm organisations are usually an

important source of new knowledge that boost collective learning and provide important inputs for innovation processes to ignite.

Figure 6.35 – Type of organisations in Douro and Aveiro with which firms cooperated towards innovation



Source: own construction

Despite the similarities, there are some differences between Douro and Aveiro that are worth referring. The majority of firms located in Aveiro state to have cooperation with travel agencies (66%). Travel agencies are the organisations that register the highest rate of cooperation with Aveiro's firms. In Douro, this item also obtained a significant response rate, with 56,6%. Although, firms located in Douro present a higher level of cooperation with cultural activities (58,5%), while in Aveiro this group is far less significant (34%). The opposite situation occurs with recreation activities, which is more significant in Aveiro (34%) than in Douro (28,3%). The accommodation sector stands as an important collaborator as well, with 46,8% of firms in Aveiro selecting these organisations as partners for the development of innovations. In Douro, only 37,7% of firms cooperate with the accommodation businesses. The major dissimilarity between the two regions under analysis relates with the links to the government as member of tourism innovation networks: in Douro, 41,5% of firms claimed to have cooperated with government bodies towards the development of innovations, almost the double than Aveiro (25,5,%). This situation may

derive from the already mentioned support that the Portuguese government provided to Douro in the last years, in terms of its development and positioning as a tourism destination in national and international markets, fostering the creation of new businesses and activities through a financial framework, increasing the promotional efforts and the requalification of overall tourism supply.

The research centres present low values (3,8% in Douro and 2,1% in Aveiro). The links with universities regarding the development of tourism innovations are more significant, although not very high, as only 26,6% of firms in Douro and 17% in Aveiro were engaged in collaboration processes with them. Despite the effort that some higher education institutions make towards the openness of academy and scientific knowledge to the overall community, this may show a persistent alienation of both parties, a situation that, considering the extreme importance of the creation and diffusion of new knowledge within innovation systems, may hamper innovation performance and, ultimately, lead systems to lock-in.

The chi-squared test was applied to analyse if there is association between the type of organisations with which tourism firms cooperate to innovate and the independent variables. Statistical significant values were found for the variables “region” and “innovation level”, “type of firm by sub-sector” and “rate of staff with tourism degree”. The results are presented in table 6.9.

The fact that tourism firms are located in the region of Douro or Aveiro influences the cooperation with cultural activities. The rate of respondents located in Douro that claims to cooperate with cultural activities towards the development of tourism innovations is of 58,5% in Douro and only 34% in Aveiro, being the larger difference observed. The association degree (C) is low (23,7%).

The innovation level influences the selection of the organisations with which firms in Douro and Aveiro cooperate, although with different patterns. For instance, in Douro, there is only statistically significant relation with accommodation businesses and knowledge institutions, while in Aveiro this occurs with private and public sector organisations, as well as with funding organisations and consultants.

Table 6.9 – Relation between the variable "organisations with which tourism firms cooperate towards innovation" and independent variables (χ^2)

Dependent Variable	Independent Variable	χ^2 statistic	fd	p-value	Pearson's Contingency Coefficient (C)
Cultural activities	Region	5,977	1	0,014	23,7%
Accommodation	Innovation level Douro	11,398	3	0,01	42,7%
Universities		9,778	3	0,021	40,1%
Vocational schools		9,197	3	0,027	39,1%
Accommodation	Innovation level Aveiro	10,608	3	0,014	42,9%
Transportation		12,427	3	0,006	45,7%
Government		10,959	3	0,012	43,5%
Funding organisations		9,994	3	0,019	41,9%
Business associations		8,786	3	0,032	39,7%
Accommodation	Type of firm Douro	11,776	5	0,038	42,6%
Restaurants		11,13	5	0,049	41,7%
Recreation		14,086	5	0,015	45,8%
Funding organisations		13,619	5	0,018	45,2%
Consultants		11,78	5	0,038	42,6%
Cultural activities	Type of firm Aveiro	17,817	5	0,003	52,4%
Universities		19,336	5	0,002	54,0%
Vocational schools		13,703	5	0,018	47,5%
Government		11,959	5	0,035	45,0%
Business associations		11,426	5	0,044	44,2%
Funding organisations	% staff tourism degree Douro	31,147	14	0,005	64,8%
Research Centre	% staff tourism degree Aveiro	46	17	0,000	70,7%

Source: own construction

In what concerns the type of respondent firm, there are also differences between both regions. In Douro, there is a relation between the type of firm and the choice of accommodation units, restaurants and recreation activities (all from private sector), and also of consultants and funding organisations (technical and financial support for new tourism projects). On the other hand, in Aveiro it influences the collaboration with cultural activities, universities, training schools, government agencies and business associations, organisations that represent the public sector, the private sector and the knowledge infrastructure (tourism projects are in a more advanced stage and firms resort to academic and practical knowledge).

Finally, it is worth mentioning that the percentage of human resources with a tourism background in terms of education presents a statistically significant relation with the option to cooperate with funding organisations in Douro, and with research centres in Aveiro. The degrees of association (C) for both situations are the highest observed, especially in the relation between the staff with tourism degree and the cooperation with research centres in Aveiro, that reaches 70,7%.

6.3.3.2 Geographical scope of cooperation

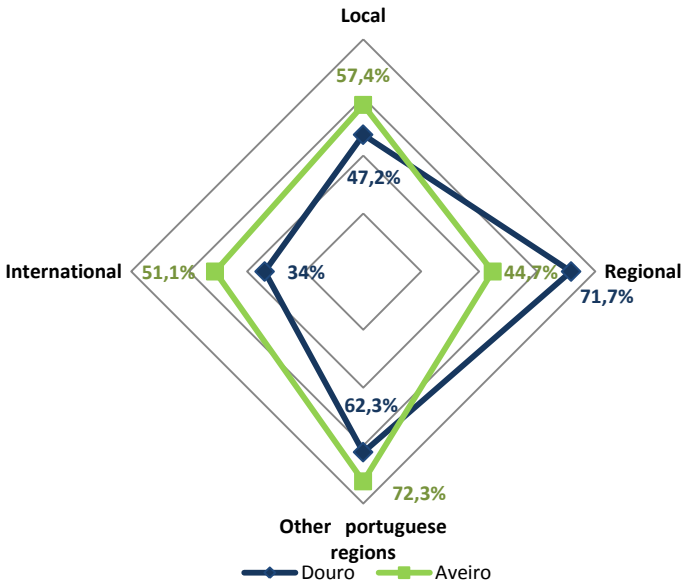
When analysing territorial innovation, namely regional innovation systems and innovation networks, the study of geographical patterns of collaboration is crucial to understand the territorial dynamics behind innovation processes. It provides important findings on the regional embeddedness of firms and innovation processes. It is known that physical proximity fosters mutual trust, reciprocity, tacit knowledge sharing and collective learning. However these proximate links should be combined with links to external (national or international) organisations. This way, new and diverse knowledge enters the system boosting innovation and preventing tourism destinations decline. Thus, this section deals with the spatial dimension of innovation networks and embeddedness.

The degree of embeddedness is assessed through two different approaches, adapted from the method of Gertler et al. (2001): first, it is analysed the geographical location of organisations with which tourism firms cooperate within innovation processes; a second contribution comes from the analysis of the sources of knowledge for tourism innovation in terms of geographical dynamics and the origin of human resources (see section 6.3.4).

Figure 6.36 shows the rate of firms engaged in innovation networks that claimed to have had at least one link of cooperation towards innovation at the different geographical levels, during the last three years. The region of Aveiro registers a larger number of firms cooperating at local, national and international levels that Douro. At local and other regions/national levels, the difference between the two regions is of about 10%. Regional and international links present a more significant difference. As observed, 71,7% of the firms located in Douro have links with firms located within the region, being the most significant geographic level for links of cooperation towards innovation, while only 34% search for international partners (the lowest value). In Aveiro,

the opposite situation occurs, with more than half the firms (51,1%) going international while searching for cooperators to develop tourism innovation, against only 34% of Douro's firms. In fact, regional links are the less representative in Aveiro, with 44,7%, as opposed to links with other Portuguese regions, which account for 72,3%.

Figure 6.36– Geographical scope of cooperation towards innovation



Note: Percentage of firms engaged in innovation networks

Source: own construction

In addition to the analysis of the number of firms that cooperated at different geographical scopes, it is interesting to examine the links to each of the sixteen types of organisations presented in the survey[28]. The results are presented in table 6.10. From a total of 484 links, 57% (276) result from the cooperation established by firms located in Douro and 43% (208) from those placed in Aveiro, which indicates that tourism firms in Douro are engaged in a more dense innovation network than Aveiro. The average number of links per firm is of 5,2 in Douro and 4,4 in Aveiro. Nonetheless, Douro has a lower rate of innovative firms (see figure 6.25: 77,1% in Douro and 84,4% in Aveiro) and a lower number of firms effectively developing innovation in cooperation (Table 6.8). This may lead to the conclusion that the cooperation links developed by Aveiro are more effective in terms of actually resulting in tourism innovations.

[28] For each type of organisation that firms state to cooperate with, they were asked to indicate the geographical scope of them (multiple answers).

Table 6.10 – Geographical scope of cooperation links with other organisations

	Douro		Aveiro	
	Nr. of links	%	Nr. of links	%
Local	73	26,4%	59	28,4%
Regional	102	37,0%	37	17,8%
Other Portuguese regions	76	27,5%	76	36,5%
International	25	9,1%	36	17,3%
Total	276	100%	208	100%
∑ internal links (local/regional)	**175**	**63,4%**	**96**	**46,2%**
∑ external links (other regions/ international)	**101**	**36,6%**	**112**	**53,8%**

Note: Number of links by type of organisation and their geographical scope

Source: own construction

Malecki (1995) claims that spatial proximity fosters intense contacts between economic agents and that, despite the presence of interaction with actors located at a long distance, the majority of contacts are with those at a shorter distance. That is, geographical proximity, as argued by Boschma (2005), influences other types of proximities and subsequently, the configuration of networks.

The number of links to external organisations (i.e., organisations located outside the regional tourism innovation system) confirms what was mentioned above: Aveiro presents a higher rate of linkages than Douro at this level (53,8% against 36,6%), as shown in table 6.9. Aveiro has a longer tradition in tourism and, as an already established tourism destination, it is understandable (and advisable) that it has the need to go outside in order to search for partners that can bring new knowledge to the system that allows organisations to develop new products, services, processes and marketing strategies that make the destination competitive at national and international markets, avoiding the lock-in effect that may eventually lead regions to decline. Douro is a relatively young destination that began to establish an international image and positioning much more recently than Aveiro. It is at an earlier stage of the tourism life cycle: it is "fashionable", endowed with new and increasing tourism products and activities and promotional efforts are being made to make the destination notorious in the international markets, most of which are framed and supported by the government's "*Vale do Douro Tourism Development Plan*".

Conversely, Douro presents a higher rate of internal links 63,4%, against 46,2% registered in Aveiro. A high number of regional links indicate a cohesive regional innovation system, based on trust, reciprocity and mutual cooperation, which stimulates knowledge spillovers and collective learning processes, favouring the development of innovation.

The application of the independent two sample t-test to the geographical scope of the established links and the independent variable "region" demonstrated that there are statistically significant differences regarding the links established at regional level (p=0,004; df=98; t=2,944), as the sample mean registered for Douro is of 1,92, and for Aveiro is of 0,77. There are no significant differences for the local, national and international levels (*p* is higher than 0,05).

Other variables were tested for the analysis of association and differences in the responses. There were found statistically significant differences through the use of the Kruskal-Wallis non-parametric test in the local (p=0,018), and international links (p=0,018) according to the sub-sector in Aveiro. Regarding the local scope of links, the accommodation firms concentrate 33,3% of responses; in what concerns international links, travel agencies stand out with 41,7%. Both these values are significantly higher than those registered for the other sub-sectors.

The links to national organisations are influenced by the number of human resources with university degree in firms located in Aveiro. The association between these two variables was confirmed by the use of the Spearman Correlation test (non-parametric alternative to Pearson's Correlation) with a p=0,008.

In the view of the above, one may conclude that both regions present different models of regional tourism innovation systems: Douro has a more inward dynamic in terms of innovation when compared to Aveiro, which presents a more significant outward pattern of links established with the purpose of developing innovations. Both models have their benefits and constraints. A cohesive internal network fosters tacit knowledge creation and sharing within regional actors as well as collective learning processes. However, if the system is engaged in little external cooperation, the knowledge created inside the system will be exhausted and become obsolete. Innovation performance will then be held back, the region will submerge in a lock-in situation and the tourism destination will move into a stage of decline. A higher number of external links and diversity of partners will result in an increased amount of new knowledge that will be combined in

different ways giving place to tourism innovation, and in a richer, more enabling and skill creating collective learning process.

Thus, the establishment of links with organisations from different geographical locations improves the effectiveness of regional innovation systems. Nonetheless, this ought to be combined with links to different types of organisations as well. As concluded above (Figure 6.34), the cooperation is mostly developed amongst tourism characteristic firms. Apart from these, it only stands out the cooperation with government bodies, universities and business associations. Even within the tourism industry, it is observed that transportation and rent-a-car firms do not play a significant role in tourism innovation networks.

It may be concluded that, in different scales, Douro and Aveiro present internal and external links, therefore revealing effective tourism innovation networks within their innovation systems.

Table 6.11 allows comparing the geographical scope of links with the type of partner organisation. In this way, it is possible to understand which types of organisations perform more significant roles in innovation networks according to the different geographical scopes:

- At **local level**, tourism firms cooperate mostly with accommodation businesses, with a slightly higher rate in Aveiro than in Douro. In Aveiro, the recreation activities occupy the same position than accommodation. Restaurants stand at in third place in the choice for local partners. In Douro, restaurants come in second place and cultural activities are ranked third.
- At **regional level**, the chosen organisations to engage in partnerships to develop tourism innovation are rather different between the two regions: Douro´s firms prefer cultural activities, accommodation units and regional government bodies. In Aveiro, training schools and business associations occupy a relevant position, with the higher number of links, followed by travel agencies, transportation and cultural activities with the same rate in the third place.
- When cooperating with organisations from **national level/other Portuguese regions** to introduce tourism innovations, both Douro and Aveiro's firms present the highest number of links with travel agencies. The most relevant type of partners that follows are, in Douro, cultural activities and government and in Aveiro accommodation and also government bodies.

- **International relationships**, although significant in terms of the overall number, are captured by a few types of partners, especially in Douro, where travel agencies/ tour operators and universities account for 76% of the total. It is worth highlighting that links with foreign universities stand at an important position. In Aveiro, relationships with travel agencies, accommodation and cultural activities represent 75% of external links.

Table 6.11 – Geographical scope of cooperation, by partners' activity

Scope / Organisation type	Local		Regional		Other regions		International	
	Douro	Aveiro	Douro	Aveiro	Douro	Aveiro	Douro	Aveiro
Accommodation	**15,1%**	**18,6%**	**11,8%**	8,1%	1,3%	**10,5%**	0%	**16,7%**
Restaurants	**13,7%**	**16,9%**	3,9%	5,4%	2,6%	6,6%	0%	0%
Travel agencies	9,6%	6,8%	9,8%	**10,8%**	**25,0%**	**26,3%**	**64,0%**	**47,2%**
Transportation	4,1%	5,1%	5,9%	**10,8%**	3,9%	3,9%	4,0%	5,6%
Rent-a-car	2,7%	1,7%	2,9%	0%	3,9%	3,9%	4,0%	5,6%
Cultural activities	**12,3%**	10,2%	**18,6%**	**10,8%**	**13,2%**	3,9%	8,0%	**11,1%**
Recreation activities	5,5%	**18,6%**	7,8%	8,1%	6,6%	6,6%	4,0%	0%
Universities	4,1%	3,4%	6,9%	5,4%	9,2%	3,9%	**12,0%**	5,6%
Research Centres	0%	0%	1,0%	2,7%	1,3%	0,0%	0%	0%
Training schools	9,6%	6,8%	4,9%	**16,2%**	7,9%	5,3%	0%	0%
Financing	4,1%	0%	2,0%	0%	5,3%	5,3%	0%	2,8%
Venture Capital	0%	0%	0%	0%	0,0%	2,6%	0%	0%
Government	9,6%	6,8%	**11,8%**	5,4%	**13,2%**	**10,5%**	0%	5,6%
Consultants	1,4%	0%	2,9%	2,7%	2,6%	3,9%	0%	0%
Business associations	6,8%	5,1%	7,8%	**13,5%**	2,6%	3,9%	4,0%	0%
Innovation agencies	1,4%	0%	2,0%	0%	1,3%	2,6%	0%	0%
Total	100%	100%	100%	100%	100,0%	100,0%	100%	100%

Source: own construction

To sum up, accommodation and restaurants are important partners, at all geographical levels. Links with transportation and rent-a-car businesses are almost inexistent regardless of their location. Travel agencies are obviously important collaborators to create new products and services that are to be placed in the market because of their critical role in the distribution channel. They are located near potential tourists, being thus relevant at national and international levels. Cultural and recreation activities are important players when considering tourism products and services and innovation, as they help to create a valuable and integrated tourism experience, adding value to the overall product. Despite their higher importance at local and regional levels, it is surprising that the rates observed are low when compared to other types of organisations.

In what concerns the role played by knowledge producers, it is interesting to observe that links to universities increase with the distance, that is, international universities present a higher rate than those located in the region or in Portugal. This indicates that new scientific knowledge entering the innovation systems comes mainly from other countries and foreign experiences. Conversely, training schools present higher importance when located locally or in the region.

Financial or venture capital organisations are generally inexpressive. At national level they represent 5,3% of established links both in Aveiro and Douro. Government bodies have some expression at local and regional level, but especially at national level, with a higher significance for Douro than Aveiro. Consultants and innovation agencies do not play an important role at any level. Business associations stand out at local and regional level, especially as partners of firms located in the region of Aveiro.

6.3.3.3 Frequency of contact

Surveyed firms were asked about the frequency of contact with the organisations with which they collaborate in order to develop tourism innovations, according to the following five point likert scale: 1= a few times a year; 2 = about once a month; 3 = about once a week; 4 = about once a day; 5 = almost permanently; 0 = no answer/don't know (see question II.4, appendix 5).

It is important to assess if scale questions are endowed with the necessary reliability and validity, measured through the existence of satisfactory levels of internal consistency. This is defined as the "*proportion of variability in the responses resulting from differences of the respondents (...) the responses differ not because the survey is confused and lead to different interpretations, but because the surveyed individuals have different opinions*". In order to perform this analysis, the Cronbach's Alpha (α) was used. This test is defined as "*the expected correlation between the applied scale and other hypothetical scales from the same universe, with an equal number of items, measuring the same characteristic*" (Pestana & Gageiro, 2005, p. 525-526). Internal consistency estimates of 70% and above are considered acceptable (Hancock & Mueller, 2010). Hill and Hill (2000) go further and argue that Cronbach's Alpha's (α) values may be classified the following way:

Table 6.12 – Scale of reliability of Cronbach's Alpha (α) values

Scale of Cronbach's Alpha (α) values	
Higher than 0,9	Excellent
Between 0,8 and 0,9	Good
Between 0,7 and 0,8	Acceptable
Between 0,6 and 0,7	Weak
Lower than 0,6	Unacceptable

Source: Hill e Hill, 2000, p. 14

The internal consistency for this question is considerable as acceptable for Aveiro and good for Douro (Table 6.13):

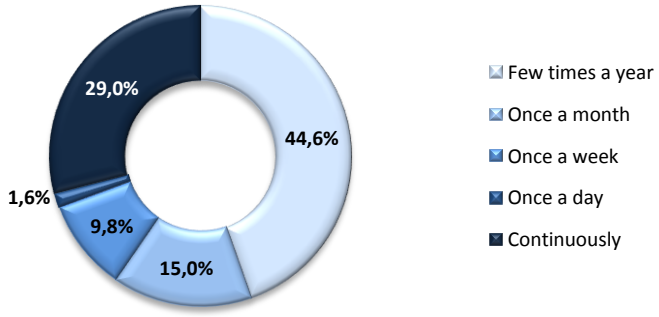
Table 6.13 – Analysis of reliability: Cronbach's Alpha (α) for Question II.6

	Cronbach's Alpha	Nr. of Items
Aveiro	0,693	16
Douro	0,841	16
Overall	0,790	16

Source: own construction

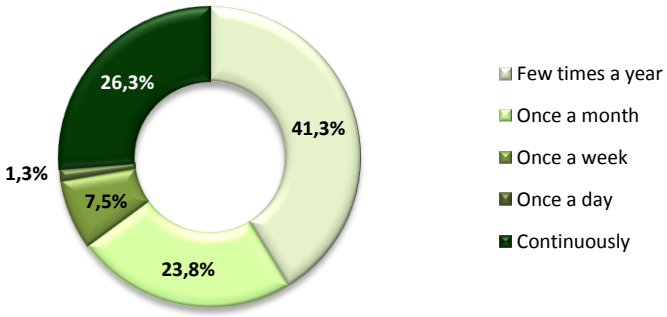
The first step aimed at characterising the overall pattern of the frequency in which tourism firms contact their partners when developing innovations in tourism. As shown in figures 6.37 and 6.38 both regions present a similar behaviour. A large share of firms (44,6% in Douro and 41,3% in Aveiro) establish contact with their innovation partners only a few times a year, indicating that interaction is sporadic and infrequent. The categories "continuously", "once a month", "once a week" and "once a day" represent common, regular and recurrent contacts. These are demonstrated by 55,4% of firms from Douro and by 58,7% from Aveiro, which indicates strong and committed relationships with their partners when the matter is innovation.

Figure 6.37 – Frequency of contact between Douro firms and organisations in their innovation network



Source: own construction

Figure 6.38 – Frequency of contact between Aveiro firms and organisations in their innovation network

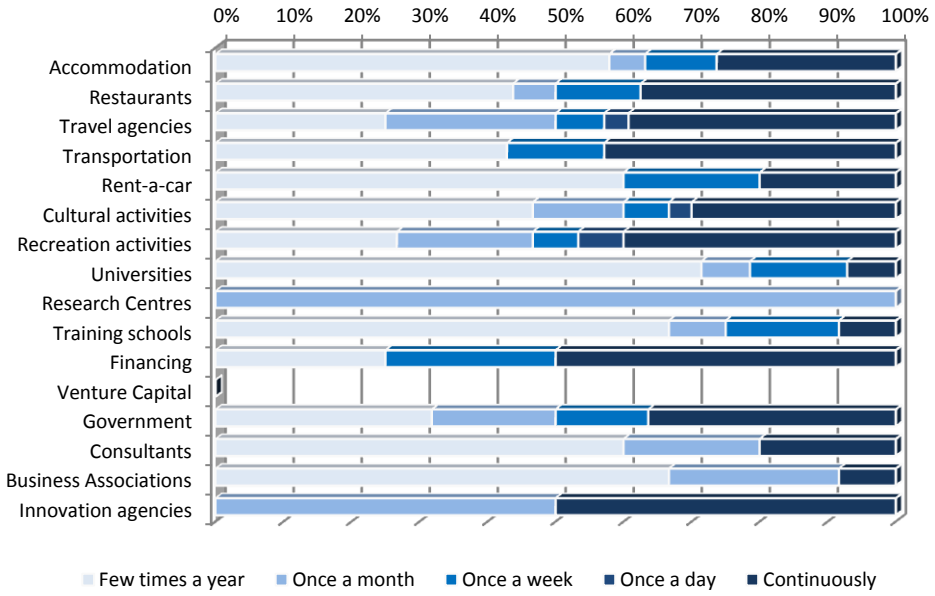


Source: own construction

The application of the independence chi-squared test reveals that the frequency of contact with other organisations is influenced by the tourism sub-sector. In Douro, there is association between the type of tourism firm and the frequency of contact with funding organisations (p=0,000; df=15; χ^2=112,31) and consultants (p=0,041; df=15; χ^2=44,845). Despite the fact that both present a high degree of association, the Contingency Coefficient (C) shows a stronger relation for the funding organisations (72,2%) than for consultants (57,2%).

In Aveiro, the tourism sub-sector influences the frequency of contact with travel agencies (p=0,039; df=20; X^2=62,755) and with universities (p=0,027; df=15; X^2=36,792). The degree of association is high for both, as the Contingency Coefficient is of 64% and 60,6%, respectively.

Figure 6.39 – Frequency of contact with cooperation partners from firms in Douro, by type of collaborator



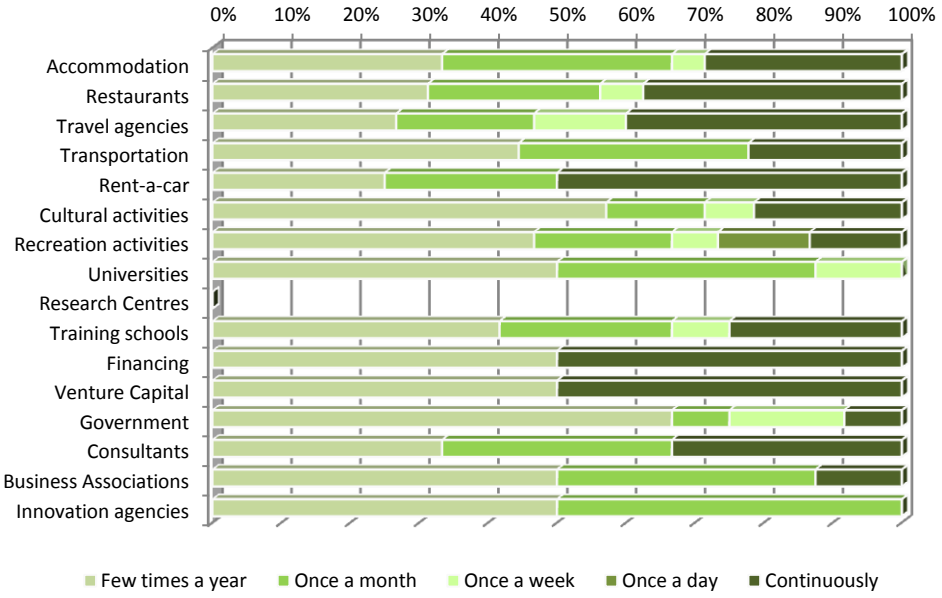
Source: own construction

Secondly, it was found useful to analyse the frequency of contacts with each type of collaborator organisation. Douro's firms interact more frequently with travel agencies, recreation activities, transportation and restaurants, within tourism activities, and with financing institutions, government bodies and innovation agencies. Fewer contacts are established with universities, training schools, business associations and consultants. It is worth referring that contacts with government agencies are more frequent in Douro than in Aveiro. This can be explained by two reasons: (i) there was a sub-regional Tourism Board that matches the NUT III (*Douro Tourism Board*) which is obviously much closer to local tourism organisations, knowing their needs, aspirations and establishing a more efficient connection with central and regional (NUT II) government bodies; (ii) the CCDR-N (*Commission for the Coordination and Development of Portugal North Region*), a decentralized public body currently under the Ministry of Agriculture, Sea, Environment and Spatial Planning, created in 2006 the Structure of Mission for the

Demarcated Region of Douro, which is "*in charge of improvement actions for the integrated development of Douro's Region and to promote the articulation between entities of the central and local administration, (…) has the responsibility to coordinate the development of programmes and public projects in the region, (…) of developing partnership with and between the municipalities, companies, research centres, training institutes or other entities in order to an economic valuation of the territory and the increase of competitiveness and territorial cohesion in the region, (…) and of the collaboration with the Portuguese Tourism Institute, in order to the execution of the Plan of Tourism Development for Douro Valley*" (CCDR-N, 2012). The existence of these two entities that operate in close cooperation with tourism firms and support the development of Douro as a tourism destination, explains the stronger interaction among tourism firms and government. Moreover, Douro is, as already mentioned, a destination in its early stage of development. New businesses, activities and infrastructures are being created and in need of public financing, which is managed by CCDR-N and framed by the above mentioned Tourism Development Plan for Douro Valley.

Firms located in Aveiro present higher interaction in terms of frequency of contact with travel agencies, accommodation units, restaurants and with rent-a-car (Figure 6.40). Surprisingly, cultural activities are among the less frequently contacted organisations. Considering non-firm organisations, business associations, consultants, financing institutions, venture capitalists and innovation agencies register the most regular pattern in terms of contacts established within innovation processes. It is interesting to observe this situation, as consultants, financing institutions and innovation agencies do not occupy a significant position in terms of privileged collaborators within the innovation network; on the contrary, they are within the less referred organisations (Figure 6.35). Conversely to Douro, firms located in Aveiro do not engage in frequent contacts with government bodies. The regional structure of public or governmental organisations with affairs in tourism is also very distinct of the one found in Douro. The Central Portugal Regional Tourism Board operates at NUT II level, comprising 77 municipalities, divided in 4 informal tourism sub-regions, one of which is "Ria de Aveiro" (the others are Naturtejo, Coimbra and Viseu/Dão-Lafões). This enlarged scope of intervention may induce a lack of identification of the tourism actors located in Aveiro with the Regional Tourism Board, resulting in weak interaction between them.

Figure 6.40 – Frequency of contact with cooperation partners of firms in Aveiro, by type of collaborator



Source: own construction

6.3.3.4 Purpose of cooperation

In order to examine the reason why organisations collaborate with the purpose of developing tourism innovations, a range of 7 options was given to respondents: (i) knowledge creation/ joint R&D; (ii) knowledge exchange; (iii) new product development; (iv) new process development; (v) new marketing/ communication strategy; (vi) financing; (vii) don't know/ no answer (see question II.5, appendix 5). According to the type of organisation previously identified as a cooperation partner, respondents had to identify one or more reasons for that particular collaboration.

The purposes underlying cooperation relationships are similar in both regions (Figure 6.41). Knowledge exchange, new product development and new marketing or communication strategies emerge as the main reasons why tourism firms search for partners towards the development of innovations. Results show that 68,1% of the contacts set up by firms from Aveiro and 67,9% of firms in Douro are established with the objective of sharing knowledge. It is also found that, in Douro, collaboration aimed at knowledge exchange is particularly high with cultural activities (19,6% of total knowledge exchange responses), government (12,4%), accommodation and travel

agencies (11,3% each). Aveiro shows a different pattern. Despite the fact that travel agencies and accommodation (both with 14,9%) are the most representative, universities and training schools appear as relevant partners within the transmission of knowledge (10,8% and 13,5%, respectively).

The second largest group of answers falls into the "new product development" option: 67,9% of respondents from Douro and 63,8% from Aveiro stated that their links with other organisations are developed with the purpose of creating a new good or service.

The Spearman's *rho* (nonparametric) and Pearson's correlation (parametric) tests were applied to each of the six cooperation purposes and all the independent variables to find statistically significant associations. A Pearson correlation was run to determine the relationship between the percentage of employers of tourism firms with university degree in Aveiro and Douro and all cooperation purposes. The results indicate that the percentage of employers of tourism firms with university degree in Aveiro and knowledge exchange have a medium, positive correlation that is statistically significant (r=0,316; n=45; p=0,035).

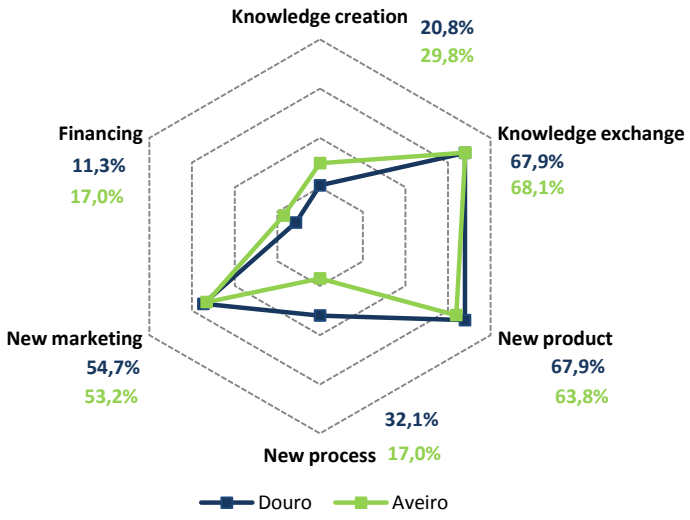
The Spearman's correlation was used to measure the association and strength of the cooperation purposes and the percentage of employers with tourism degree and the age of respondents. There was found a positive correlation between the rate of staff with a tourism degree in Aveiro's firms and the number of links with the objective of developing new products (r_s=0,340; p=0,021). The age of tourism firms in Aveiro and the cooperation for knowledge creation are also positively correlated (r_s=0,298; p=0,042).

The independent samples t-test reported a difference in the number of links established with the purpose of developing new marketing strategies according to the type of innovator in Aveiro (t=-2365; df=14391; p=0,033). Major innovators present statistically significant lower links with other organisations (mean=0,79) than minor innovators (mean=2,83) within the development of new marketing strategies.

New marketing strategies are used as an argument for cooperation for over half the firms. In the Douro region, the most important partners for new marketing and communication strategies are travel agencies (21%), cultural activities (16%) and accommodation units (14,8%). Government

bodies represent 10% of the total links established for this purpose. Aveiro's firms also favour travel agencies as their main partner (25,4%) and accommodation units (20,3%). However, they attribute a high importance to restaurants (10,2%) and universities (10,2%), a situation that is not verified in Douro. Government plays an inferior role, with 8,5% of links.

Figure 6.41 – Purpose of cooperation for the development of innovation



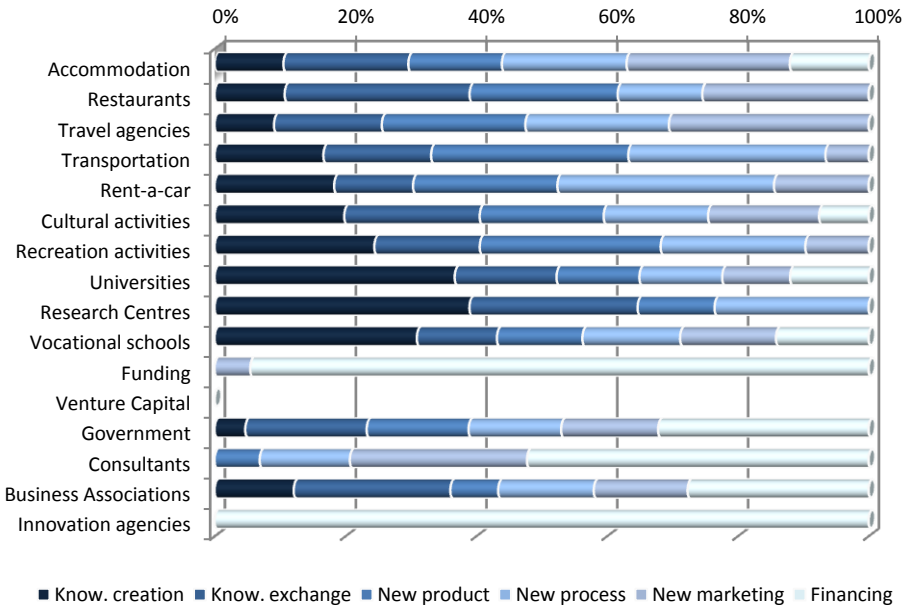
Source: own construction

Knowledge creation presents lower values. Nonetheless, nearly 30% of the firms from Aveiro selected it as the basis for the creation of links with other organisations, overcoming the 20,8% of responses registered in Douro. With the aim of creating new knowledge in order to develop innovations in tourism, Aveiro's firms resort mainly to universities, training schools and government bodies (each with 14,7%). These organisations are followed by cultural activities which also present a good position as collaborators (11,8%). In the Douro region, universities achieve the highest rate, with 21,9% of total links. If the results for research centres (3,1%) are added, knowledge producers reach 25%. Training schools are also in a significant position, with 15,6%. In total, education and research organisations represent 40,6% of total links for new knowledge creation, against 29,4% in Aveiro. These values confirm the importance of scientific knowledge to innovation, as well as a closer relationship between knowledge producers and local businesses. Cultural activities stand out with 18,8% of responses.

Despite the fact that Aveiro has a higher percentage of firms that introduced process innovation when compared to Douro (Figure 6.28), the later resorts more to other organisations in order to

develop these type of innovations. Travel agencies, cultural activities, accommodation businesses and recreation activities are at the forefront of cooperation partners for the development of new processes in both regions.

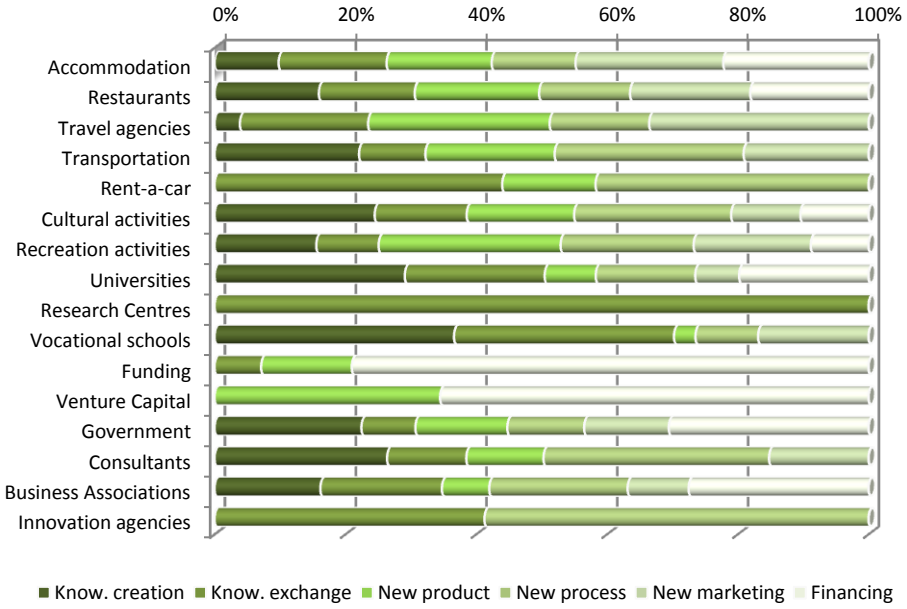
Figure 6.42 – Purpose of cooperation for the development of innovation in Douro, by type of collaborator



Source: own construction

Finally, funding emerges as more significant in Aveiro (17%) than in Douro (11,3%). Naturally, financing organisations represent important partners (21,4% in Douro and 15% in Aveiro). Despite this, government bodies appear as equally important in financing tourism innovation in the Douro region (21,4%) and as the most important in Aveiro (20%). This can be explained by the fact that decentralized government bodies at regional level, namely the Commissions for the Coordination and Development of Portugal North Region and Centre Region are responsible for the management of the European Union structural funds, to which public and private organisations resort to in order to finance their new projects.

Figure 6.43 – Purpose of cooperation for the development of innovation in Aveiro, by type of collaborator



Source: own construction

A comparison was also made at an aggregated level, between the purpose of cooperation with tourism firms and with non-profit organisations (Table 6.14). In the region of Douro, respondents claim to cooperate mostly with tourism firms for all the identified purposes (knowledge creation and sharing and new product, process and marketing development), except for funding reasons, where the majority (86%) search for the cooperation of non-profit organisations. In Aveiro, the majority of surveyed firms cooperate with other tourism firms for knowledge exchange and new product, process and marketing. However, in what regards the cooperation for knowledge creation, most of them (53%) resort to non-profit organisations. Within this context, one may highlight the significant role played by knowledge producers, namely the university and the research centre. Funding is also a motive for cooperating with non-profit institutions, although in a much lower rate (60%) than Douro.

In overall terms, there is a similarity in the proportion of responses from both regions. The cooperation within innovation processes is higher with tourism firms (about 65%) than with non-profit organisations (35%).

Table 6.14 – Purpose of cooperation: comparison between tourism firms and non-profit organisations in Douro and Aveiro (%)

	Knowledge creation	Knowledge exchange	New product	New process	New marketing	Funding	Total
DOURO							
Tourism Firms	53,1%	63,9%	71,7%	67,9%	67,9%	14,3%	64,8%
Non-profit organisations	46,9%	36,1%	28,3%	32,1%	32,1%	85,7%	35,2%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
AVEIRO							
Tourism Firms	47,1%	56,8%	76,3%	65,4%	76,3%	40,0%	64,4%
Non-profit organisations	52,9%	43,2%	23,7%	34,6%	23,7%	60,0%	35,6%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Source: own construction

6.3.3.5 Contribution of organisations for regional tourism innovation

The final part of this section of the survey aimed at understanding the importance of the different types of organisations for regional tourism innovation, namely in terms of the development of innovative outputs (products, processes, marketing strategies and actions), overall dynamics and support to the creation and implementation of innovation activities. Respondents were asked to classify the importance of each of the 16 different types of firms between 1 (not important) and 5 (very important).

According to the results presented in table 6.12, it may be concluded that the reliability of this question is excellent for the Aveiro and Douro regions, as both values are higher than 0,9, and good for the overall analysis (both regions together), as the Cronbach's Alpha (α) is of 0,84.

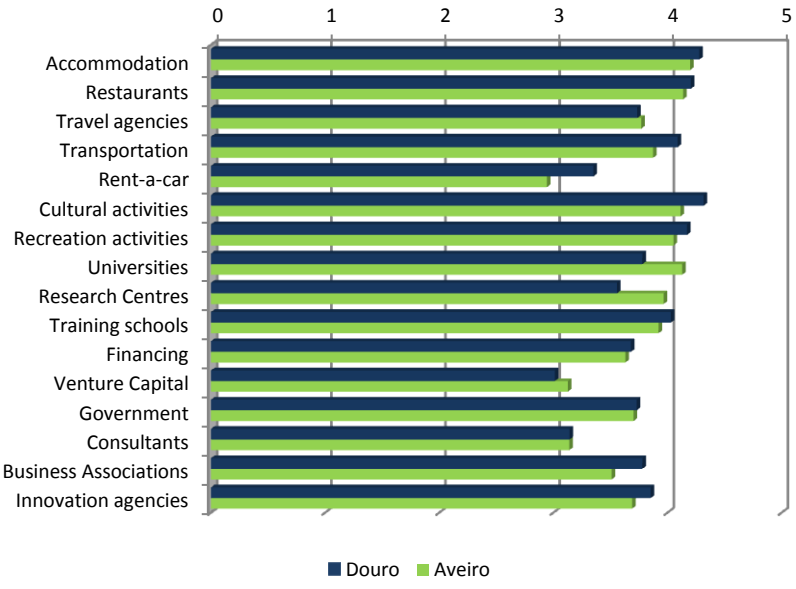
Table 6.15 – Analysis of reliability: Cronbach's Alpha (α) for Question II.6

	Cronbach's Alpha	Nr. of Items
Aveiro	0,920	16
Douro	0,913	16
Total	0,841	16

Source: own construction

In average, it is considered by surveyed firms that accommodation and cultural activities are the most important organisations in what concerns the dynamics of Douro's regional tourism innovation, both with an average score of 4,3. With a 4,2 average score, restaurants and recreation activities also stand out as the second most important. Figure 6.44 presents the percentage of responses for each level of importance attributed to different organisations. Cultural activities are considered as very important by 56% of surveyed tourism firms, followed by accommodation units with 50% and recreation activities with 49,5%. Restaurants also stand out with 46,7% of responses. By contrast, venture capital organisations are considered as not important by 11,4% of the surveyed or as having little importance by 24,1%, being the type of organisation that is considered to be the least important for regional tourism innovation. Rent-a-car firms are also considered as less dynamic (7,2% of responses as not important and 16,5% as little importance).

Figure 6.44 – Effective importance of organisations for regional tourism innovation (average)



1= Not important; 5=very important

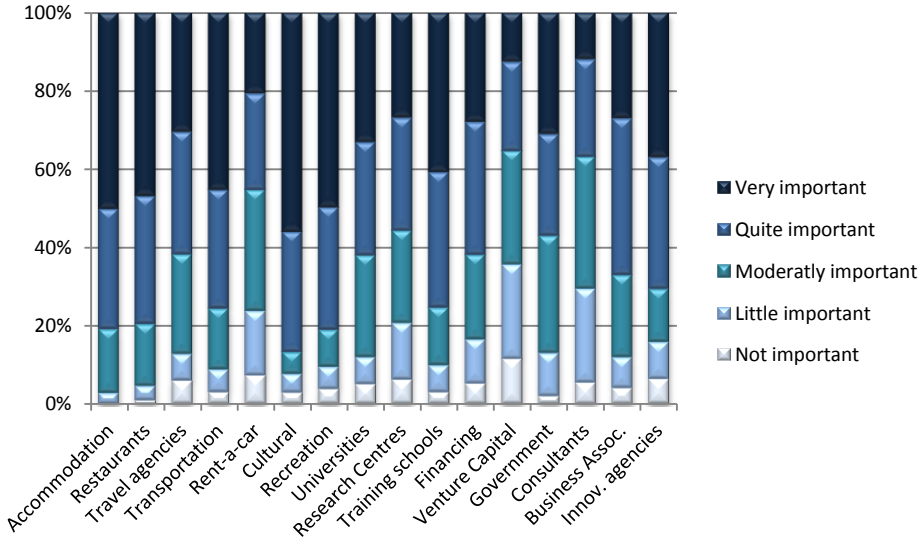
Source: own construction

It is also worth highlighting the role played by transportation and training schools, granting them an average classification of 4,1 and 4 points. On the opposite, venture capitalists and consultancy firms register the lower values, with 3 and 3,1 respectively. However, while venture capitalists have a very high percentage of responses as not important, consultants only register 5,4% at this level. Nevertheless, all types of organisations present positive average values (if one consider the

2,5 as the lowest possible positive score). Generally speaking, it may be concluded that tourism specific activities are considered more important for tourism innovation than non-profit organisations.

In Aveiro, accommodation firms achieve the highest average score with a 4,2 in the scale of importance, followed by restaurants, cultural and recreation activities, which register 4,1 each (Figure 6.44). Despite this similarity of patterns with the Douro region, Aveiro presents an outstanding difference that highly influences the dynamics of regional innovation systems: knowledge producers, that is, universities and research centres (which in this case refer to the University of Aveiro and its research centre GOVCOPP) are among the most important agents of innovation, with an average score of 4,1 and 4. When observing Figure 6.44, these types of organisations also stand out as having the highest percentage of responses as very important and quite important. In fact, recreation activities register the peak value, as 47,4% of the respondents consider them as very important, followed by accommodation businesses (44,8%) and cultural activities (43,8%). The relative values also confirm the high average registered by universities and research centres, with respectively 43% and 38,2% considering them as very important for the innovation in tourism developed in the region of Aveiro.

Figure 6.45 – Effective importance of organisations for regional tourism innovation in Douro, by type of organisation (%)



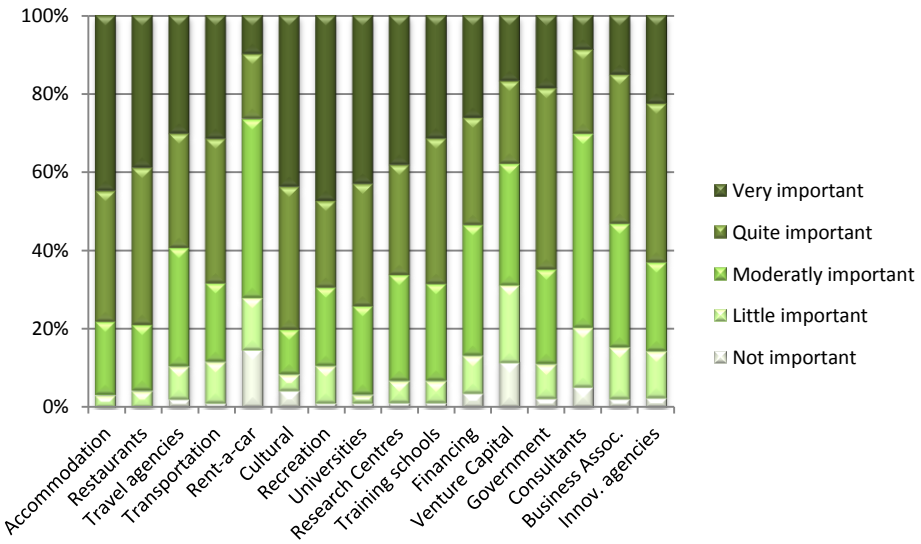
Source: own construction

Considering that this survey was completed by tourism firms, it is worth to note that this may indicate an increased proximity between the university and research (scientific knowledge) and the regional tourism economic agents within tourism innovation processes. Moreover, the knowledge produced within the university appears to meet the needs of the economic fabric and is contributing to the development of tourism innovations. This type of dynamics are not observed nor claimed to exist by organisations located in Douro.

In terms of the least important actors, there are no significant differences between both regions, as in Aveiro the lower average levels of importance are equally occupied by venture capitalists and consultants. However, considering the relative values, rent-a-car is the typology with more responses as not important (14,4% of total, which is the double of the percentage registered in Douro for these firms), followed by venture capital organisations (11,3%). Only 5,1% of the respondents consider consultants as not important for tourism innovation in Aveiro. Moreover, 49,4% believe that they are moderately important and 21,5%, quite important.

It is interesting to note that while government agencies play the exact same role in both regions (3,7), the private business associations seem to be more dynamic in Douro (3,8) than in Aveiro (3,5).

Figure 6.46 – Effective importance of organisations for regional tourism innovation in Aveiro, by type of organisation (%)



Source: own construction

As previously mentioned tourism organisations have a higher contribution to regional tourism innovation than the non-profit organisations. In Douro, tourism businesses register an overall score of 4,1, while other organisations only reach a mean of 3,6. In Aveiro, the overall average results are lower for tourism firms than in Douro (3,9), although still higher than other organisations (3,6). To sum up, the respondents of Douro grant a higher importance to tourism organisations than Aveiro in what concerns the development and implementation of innovations in the tourism industry. Both register the same average scores for other organisations. When considering all typologies, the mean is very similar for both regions (3,8 for Douro and 3,7 for Aveiro). The standard deviation is quite low in all cases, which informs that there is not a significant dispersion from the average (there is a low variation in the responses), that is, data is very close to the mean, and thus the mean is representative of the observed values (Table 6.16).

Table 6.16 – Overall importance given to organisations regarding regional tourism innovation

	Douro			Aveiro		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
All organisations	67	3,8	0,71	59	3,7	0,68
Tourism firms	90	4,1	0,68	89	3,9	0,70
Other organisations	72	3,6	0,86	63	3,6	0,80

Source: own construction

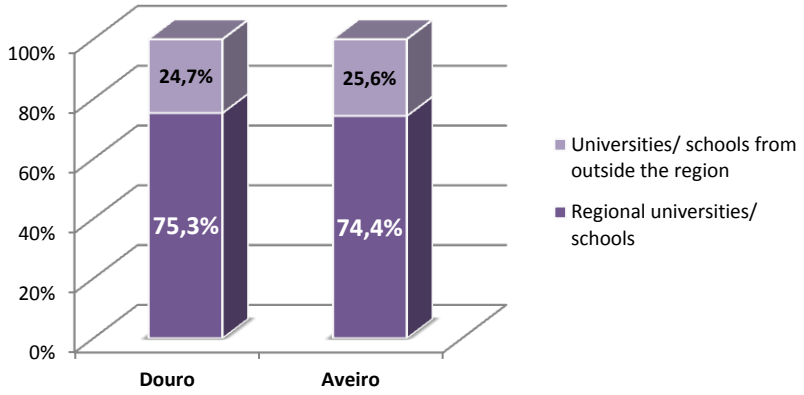
The independent samples t-test was run to identify differences in the importance given to all organisations, tourism firms and other organisations from firms located in Douro and in Aveiro (variable "region"). It was confirmed that respondents located in Douro believe that tourism firms are more important for regional tourism innovation than respondents located in Aveiro (*t*=1,992; p= 0,048). The same situation occurs when comparing the responses given by innovative and non-innovative tourism firms (*t*=3,700; p= 0,001). Innovators attribute a mean importance of tourism firms for innovation of 4,1, while non-innovators register 3,5. No other statistically significant differences were found.

6.3.4 Regional knowledge infrastructure

The third part of the survey aimed at analysing the regional knowledge infrastructure and its role in the regional tourism innovation. In order to do so, some important dimensions were

considered, namely (i) the origin of human resources hired by tourism firms (if they obtained their training and education in tourism in the universities and/or schools located in the region); (ii) the most important sources of knowledge used to develop tourism innovations; and (iii) the most important source of knowledge in terms of geographical and sectoral relations.

Figure 6.47 – Origin of human resources with tourism education



Source: own construction

In both regions, the majority of the human resources hired by tourism firms were trained by universities and/or schools located in that same region. Specifically, in Douro 75,3% of firms perform this practice and in Aveiro, 74,4% (Figure 6.47).

However, it is worth noting that, among the surveyed firms, 38,5% in Douro and 34% in Aveiro do not employ a single person with education in tourism (see section 6.3.1.5). Furthermore, in nearly 50% of firms, less than 20% of the employees have a tourism degree. In Aveiro, only 7,4% of firms have more than 80% of total human resources with a tourism degree. This value is significantly lower in Douro (2,2%).

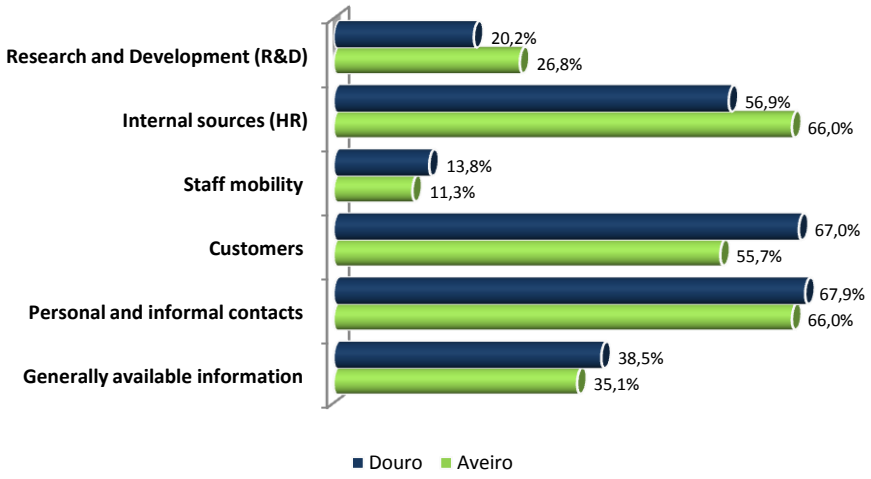
Nevertheless, the high percentage of firms hiring human resources that obtained their knowledge on tourism in regional education institutions indicates that the universities and training schools provide qualified human resources to regional firms and endow them with the necessary knowledge and tools to develop innovative processes and practices. It is also a strong indicator of regional embeddedness of tourism firms and organisations which increases the potential for the establishment of strong networks.

As mentioned in several contexts in this work, knowledge is a fundamental support of regional innovation. As Cooke (2007) and Feldman (1994) stated, knowledge is the key driver of innovation. Knowledge can be codified or tacit and can be internally produced or obtained from other sources within processes of collective learning. It is acknowledged that codified knowledge has a higher degree of formalisation and that tacit knowledge requires physical and social proximity (Breschi & Lissoni, 2000; Polanyi, 1966), that is, the establishment of relationships of trust and reciprocity within networks of organisations that create regional knowledge spillovers. Tacit knowledge is locally embedded and dependent on the context on which it is created (Morgan, 2001).

The following analysis has the purpose of identifying the most important sources of knowledge used for tourism innovation in terms of processes (Figure 6.48) and of geographical scope of actors (Figures 6.49 and 6.50) providing economic useful knowledge.

In the question III.2, firms were asked to select the three sources of knowledge that are most important for the development of tourism innovation, out of six items summarised from the main knowledge sources identified in the literature, especially from the writings of Dosi (1988), Saxenian (1994) and Marshall (1890). Although with different proportions, the results are similar for both regions: internal sources (human resources), customers and personal and informal contacts are the main suppliers of knowledge used for innovation. Douro firms confer a higher importance to personal and informal contacts (67,9%), followed by customers (67%) and human resources (56,9%). In Aveiro, human resources and personal and informal contacts register the same value with 66% each, while customers were selected by 55,7% of respondents. It is interesting to note that there are no significant differences between regions, although customers are a more relevant source of knowledge for tourism firms located in Douro. The application of the independence Pearson's chi-squared test reported a statistically significant association between the selection of clients as an important knowledge source and the type of firm by sub-sector located in Aveiro (p=0,003; df=5; χ^2=18,350) and the rate of human resources with a tourism degree employed in tourism firms from Douro (p=0,044; df=5; χ^2=11,375). The strength of the association, measured with the contingency coefficient (C) is of 40% in the first case and 33,3% in the later. The variables "human resources" and the percentage of human resources with university degree in tourism firms from Aveiro are also associated (p=0,045; df=21; χ^2=33,147) with a C of 51,3%.

Figure 6.48 – Importance of knowledge sources for tourism innovation



Source: own construction

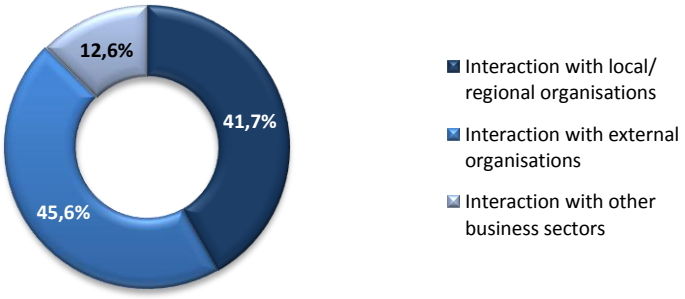
The item with a lower score is staff mobility, that is, the knowledge that employees bring from other organisations where they have worked. The scientific knowledge resulting from research and development is only important for 20,2% of Douro's tourism firms and for 26,8% of those located in Aveiro. This higher proportion registered by the respondents of Aveiro is in line with the level of importance that universities and research centres of Aveiro represent for regional tourism innovation (Figure 6.44). Statistically significant associations were found between the selection of R&D as a main knowledge source and the type of firm by sub-sector located in Aveiro (p=0,029; df=5; χ^2=12,448) and the percentage of human sources with university degree in Aveiro's tourism firms (p=0,039; df=21; χ^2=33,686). The contingency coefficient (C) is higher for the later (51,6%) than for the first (33,7%).

However, in face of these previous results, it was expected that R&D were considered to be a more important knowledge source than effectively is. This situation may be explained by the fact that tourism firms may not be considering the knowledge developed by universities and research centres as Research and Development, which may be positive if it means that this knowledge is actually reaching firms and being used for the development of tourism innovation. It should be considered that the term "R&D" is frequently understood by firms as an intricate process resulting in a type of knowledge that is inaccessible due to its complexity and forms of dissemination (scientific papers) which often are not available to SMEs.

On the opposite, globally available information is a relevant knowledge source for 38,5% of firms from Douro and for 35,1% of Aveiro. The selection of this item is dependent on the tourism sub-sector firm located in Aveiro (p=0,027; df=5; χ^2=12,632), with an association degree of 34%. There were also found statistically significant associations between the choice of "clients" (p=0,000; df=1; χ^2=15,624) and of "globally available information" (p=0,013; df=1; χ^2=6,158) as knowledge sources and "innovative and non-innovative tourism firms". The rate of innovative firms that selected the item "clients" is significantly higher than non-innovators (72% vs. 28%). Out of the total of those who selected "globally available information", 90% are innovators and 10% are non-innovators.

In a global assessment, beyond the item related to staff mobility, the knowledge resulting from R&D and from globally available information register the lower scores in terms of their importance as sources of knowledge used to innovate. They are both included in codified knowledge. On the contrary, the most important knowledge is tacit in nature. It is also worth referring that the knowledge obtained through personal and informal contacts is the most relevant, which usually results from the engagement in networks founded in trustful relations. It is an expression of the social capital gained from comprising such social structures.

Figure 6.49 – Importance of sources of knowledge for tourism innovation: geographical and sectoral dynamics - Douro



Missing: 6

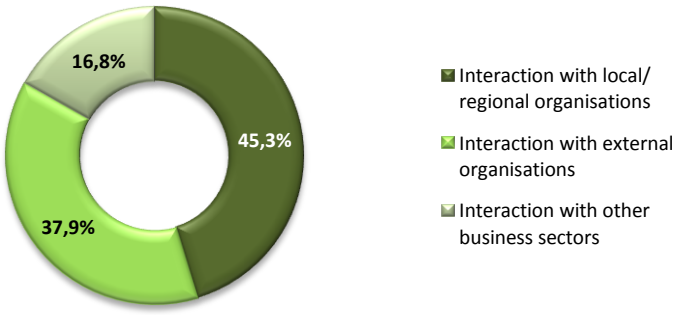
Source: own construction

Subsequent to the analysis of the mains sources of innovation in terms of processes related to codified and tacit knowledge, it is relevant to evaluate the knowledge sources according to

geographical and sectoral dynamics. In order to do so, respondents selected the main knowledge source from three different options: interaction with local or regional organisations; interaction with external organisations; and interaction with other business sectors. This issue is approached by Bathelt et al. (2004). The authors analyse the spatiality of knowledge creation and the dynamics underlying the process of knowledge creation within clusters, characterising the *local buzz* (knowledge resulting from regional interactions) and *global pipelines* (knowledge created within external links). They argue that the both types of interactions are important for the creation and transfer of codified and tacit knowledge, and thus firms are endowed with particular advantages to the development of innovations.

Figures 6.49 and 6.50 allow the comparison between the regions of Douro and Aveiro. The majority of firms located in Douro (45,6%) selected the interaction with external organisations (those located in other Portuguese regions or countries) as the most important form of access to knowledge that supports the development of tourism innovations. Nonetheless, the data related to the analysis of networks' patterns (section 6.3.3.2) indicate that Douro's tourism firms have less external links (36,6%) than internal (local/regional) links (63,4%). This leads to the conclusion that the regional tourism innovation system of Douro is actually regionally embedded, but that many firms feel the need to access knowledge produced by external or foreign organisations in order to continue developing innovations in tourism industry. However, an also significant share of 41,7% of the respondents consider that the interaction with local or regional organisations are the most important knowledge source. The relation with firms from other business sectors is only important for 12,6% of the firms.

Figure 6.50 – Importance of sources of knowledge for tourism innovation: geographical and sectoral dynamics - Aveiro



Source: own construction

The opposite situation occurs in Aveiro, although tourism firms register a higher share of relations with organisations from outside the system (53,8% vs. 46,2% of internal links), 45,3% consider that the interaction with regional organisations is the most important knowledge source in terms of territorial dynamics. Several authors, such as Feldman (2000), argue that new knowledge is shared more rapidly among individuals that are spatially proximate, confirming the importance of regional networks and innovation systems. The fact that Aveiro is in a more advanced stage of development and thus presents more external links may explain the need to engage in more internal links with the objective of strengthen the regional tourism innovation system. The interaction with other business sectors is considered as the most important knowledge source by 16,8% of total respondents, also a sign of the phase in which tourism in Aveiro is in terms of its development, as economic agents need to access to diversified and distinct knowledge sources in order to provide clients with actually innovative tourism products and services. This may result not only from the access to external sources, but also from the relations with firms from other industries, whether in terms of ideas that can be adjusted to tourism products, or in terms of effective cooperation to create integrated innovative outputs.

Within this context, and after the application of the Pearson's chi-squared test to all independent variables, it was found one statistically significant association between the most important knowledge source and the tourism sub-sector firm in Douro (p=0,047; df=10; χ^2=18,491), with a C of 39%.

6.3.5 Regional specific factors and innovation

In chapter 3, several territorial innovation models were analysed. Despite the existence of distinct approaches, they are all based on the relevance of determined regionally-specific factors. The influence of space, the agglomeration of economic activities generating externalities, the cooperation culture, the uniqueness of resources, governance, among other factors, create an atmosphere and unique conditions that strongly influence the way firms and organisations engage in innovation processes at regional level.

Table 6.17 – Analysis of reliability: Cronbach's Alpha (α) for Question IV.1

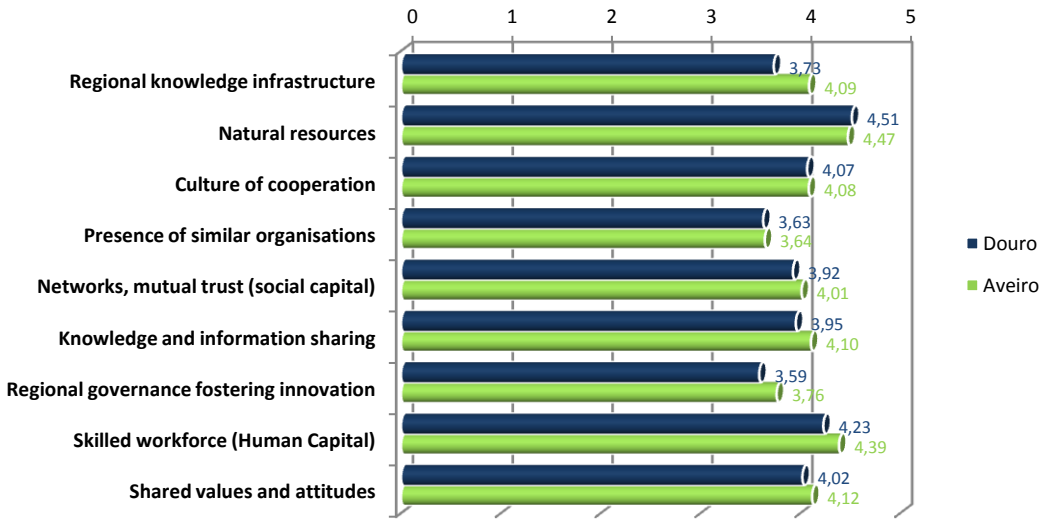
	Cronbach's Alpha	Nr. of Items
Aveiro	0,874	9
Douro	0,884	9
Total	0,879	9

Source: own construction

The application of Cronbach's Alpha (α) revealed a good international consistency for the question IV.1, for all the three levels of analysis. The results are higher than 0,8, which means that the data is reliable.

The literature review provided important insights on regional specific factors that influence systemic innovation. Accordingly, nine items were produced and included in the survey for respondents to classify as a function of their effective importance for regional tourism innovation, from 1 (not important) to 5 (very important). Figure 6.51 presents the average classification of each item in the regions of Douro and Aveiro. The results allow the assessment of the regional embeddedness of tourism innovation.

Figure 6.51 – Importance of regional specific factors for innovation



1= Not important; 5=very important

Source: own construction

It is clear that, in average, the results do not differ significantly between both regions. The item "natural resources" registers the highest level of importance, with 4,51 for Douro and 4,47 for Aveiro. It is not surprising that this factor achieves such a score, as natural attractions constitute a relevant foundation of tourism and of the development of new tourism products and services, as well as of new marketing strategies due to the fact that they are frequently used to create the destination image. This is especially important in the regions under analysis that, despite the diversity of attractions that they offer to tourists, are strongly attached to natural attributes, namely the Douro river and the vineyards landscape in Douro (classified as World Heritage by UNESCO), and the estuary in Aveiro.

The existence of a skilled workforce with competencies for innovation that act as a vehicle for the transfer of tacit knowledge and endowed with a high absorptive capacity is crucial for the development of innovative outputs (Marshal, 1890). Tourism firms can innovate endogenously by creatively combining their internal assets based on human capital (Peters & Buhalis, 2008). This is relevant for all business sectors, but especially important for service organisations (where tourism is included), as innovation can occur during the contact with the clients. "Human capital" registers a high average score in both regions, being, however, more relevant for the development of regional tourism innovation in Aveiro (4,4) than in Douro (4,2).

The values and attitudes shared among economic agents strongly influence the innovation dynamics, as they shape the behaviour of individuals and organisations by acquiring similar patterns, fostering the creation of trustful relationships within networks. Thus, the potential for engagement in joint innovation processes increase. Besides this organisational proximity, cognitive proximity may also emerge, which is essential for the capacity to absorb new knowledge, to learn and, consequently, to innovate (Boschma, 2005). According to Saxenian (1994) the existence of similar values, attitudes and knowledge was one of the grounds for the success of Silicon Valley as an innovation cluster, against the lack of this condition in the Route 128 cluster. This item also obtained significant positive results. Tourism firms located in Aveiro and in Douro consider that the respective regions are endowed with shared values and attitudes and that it contributes significantly for regional tourism innovation. Nonetheless, it seems to be more relevant in Aveiro (with an average score of 4,12) than in Douro (4,02).

Knowledge and information sharing, despite being one of the main grounds of networked innovation, presents slightly lower average values, especially in Douro. This may indicate that, in spite of the fact that tourism firms acknowledge its importance, they also appear to believe that it should be more recurrent in practice. Douro´s firms rate this item with 3,9, and Aveiro's with 4,1, which leads to conclude that in Aveiro knowledge sharing is more widespread and effectively used for tourism innovation.

The existence of a culture of cooperation is crucial for the establishment of robust networks and regional innovation processes. When analysing the respective results, it has the same level of importance for both regions (4,1).

The item "regional knowledge infrastructure" relates not only to the existence of universities and research centres that work on tourism knowledge, but to the effective cooperation between those institutions and tourism firms that are based on the transfer of economic useful knowledge. As argued by Asheim et al. (2003), successful cooperation towards innovation requires a match between academic knowledge and the practice of firms. Moreover, the authors consider that spin-offs from universities prove to be an efficient vehicle for capitalising scientific knowledge, and that firms (and especially SMEs) are highly dependent on their skilled human resources in order to create and maintain their innovative capacity and performance, which are supplied by regional universities. These three areas are the most important support to innovation that the regional knowledge infrastructure can provide to tourism firms. The difference between the classification of this item (4,01 in Aveiro and 3,7 in Douro, the highest difference observed in this question) confirms that universities, research centres and academic knowledge play a more important role in supporting tourism innovation in the region of Aveiro. This may be explained by the existence of a tourism spin-off from the university (idtour, unique solutions) and by the strong inter-relation between the university of Aveiro and tourism SMEs which helps to produce applied research and scientific knowledge that meets the needs of these firms.

Social capital obtained through the existence of innovation networks where mutual trust among tourist actors that actually facilitate cooperation for mutual benefits exists is valued with 4,01 in Aveiro and 3,9 in Douro.

The presence of similar organisations in the form of a tourism cluster that, due to the geographical proximity, promotes joint innovation registers an equal average for both regions, with only 3,6. A similar position is observed for the item related to a regional governance structure that effectively supports tourism innovation (3,8 for Aveiro, and 3,6 for Douro). These are the regional specific factors that contribute less to the development of innovative practices, processes and outputs in regional tourism.

Table 6.18 – Overall importance granted to regional specific factors

	N	Mean	Std. Deviation
Douro	88	3,9	0,74
Aveiro	87	4,1	0,64

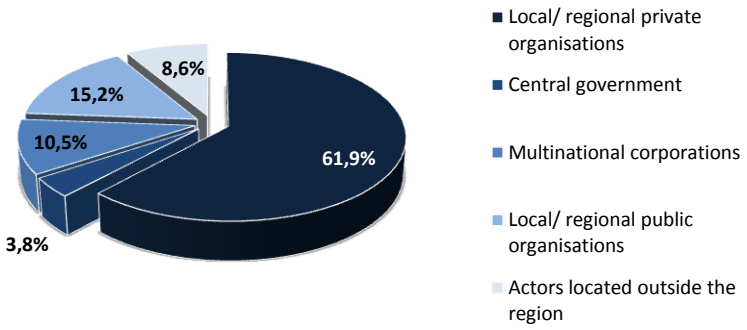
Source: own construction

The overall results indicate that Aveiro grants a slightly higher importance to the group of regional specific factors that foster tourism innovation, as well as a lower variation in the responses (Table 6.18). When considering each item in isolation, it is also evident that Aveiro registers higher average scores in all of them, with the exception of "shared values and attitudes". The values are, in fact, very close to each other. It may be concluded that, concerning the relevance of regional specific features, tourism innovation is more regionally embedded in Aveiro than in Douro.

The independent sample t-test was computed to analyse if there were statistically significant differences in the responses to the overall importance given by innovative and non-innovative firms. The result show that they are significantly different (*t*= 3,023; df= 169; p= 0,003). The mean of the innovative firms is of 4,08 and of non-innovative firms is of 3,7.

The Pearson's chi-squared test was applied to search for relationships of dependence between "innovative and non-innovative firms" and the importance given to all regional specific factors for innovation. Statistically significant associations were encountered for the level of importance of the "presence of similar organisations" (p=0,001; df=4; χ^2=19,662), "social capital from networks" (p=0,036; df=4; χ^2=10,283), "knowledge sharing" (p=0,011; df=4; χ^2=13,011), "governance fostering innovation" (p=0,048; df=4; χ^2=9,598) and "human capital" (p=0,043; df=4; χ^2=9,843). In all cases, innovative tourism firms attribute a higher level of importance to these factors than non-innovative ones.

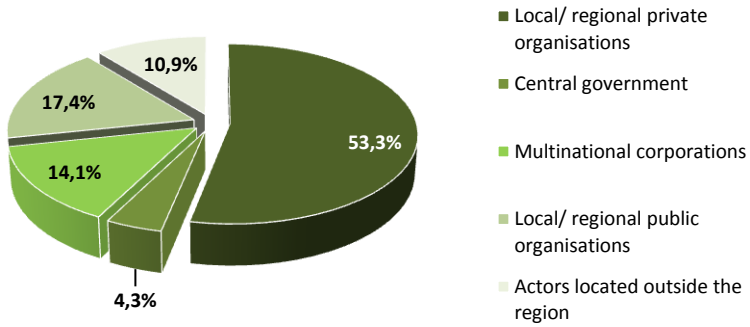
Figure 6.52 – Actors who usually introduce tourism innovations in Douro



Source: own construction

Regional embeddedness of tourism innovation can also be evaluated through the identification of the actors that usually have the initiative of creating innovative products and services. In both regions, local and regional firms are the main promoters of tourism innovation (62% in Douro and 53% in Aveiro), as depicted in figures 6.52 and 6.53.

Figure 6.53 – Actors who usually introduce tourism innovations in Aveiro



Source: own construction

Local and regional public agencies are the second most important actors, with 15,2% in Douro and 17,4% in Aveiro. If both types of organisations are considered together, it is concluded that regional organisations are responsible for 77% of tourism innovations in Douro and 70% in Aveiro.

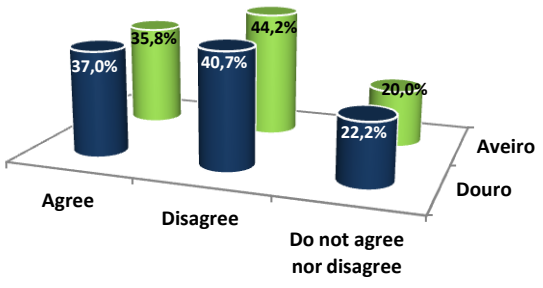
Public agencies, whether local/ regional or national have a higher weight in Aveiro, as well as multinational corporations.

To sum up, Aveiro presents a higher regional embeddedness of tourism innovation in what concerns the regional specific factors, but when it comes to analysing the organisations responsible for introducing innovation, the Douro region relies more on local and regional structures than Aveiro. Regional specific factors are more supportive of tourism innovation in Aveiro, while regional organisations play a more significant role in Douro. Tourism innovation in Aveiro is more context-driven and in Douro is mainly organisational-driven.

6.3.6 Perception of tourism firms regarding regional innovation environment

The final part of the survey was designed with the objective of gathering information on the perception of tourism firms regarding the regional innovation environment. Nine statements were presented to the respondents, who had to say if they "agree", "disagree" or "do not agree nor disagree" with the exposed ideas. In order to better perform the data analysis, the statements were divided into three main dimensions: (i) overall conditions; (ii) networks; and (iii) innovation and destination development.

Table 6.19 – Perception on the regions' overall conditions to innovate

Statement	Responses (%)
[QV.3] ***In my region, I find the necessary conditions to develop tourism innovations.***	

Source: own construction

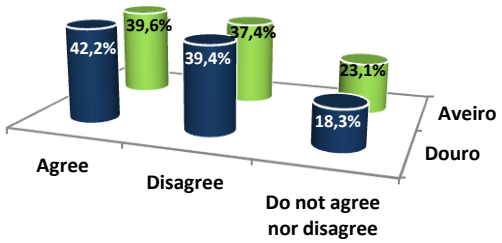
The statement "*In my region, I find the necessary conditions to develop tourism innovations*" intended to explore the perception of surveyed tourism firms on the overall access to resources,

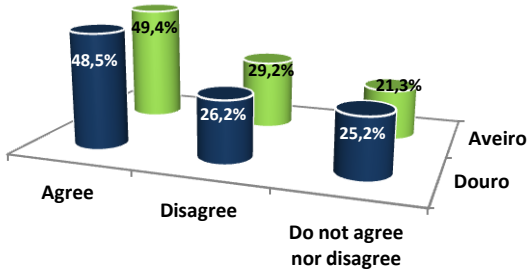
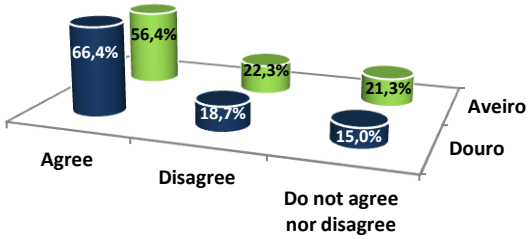
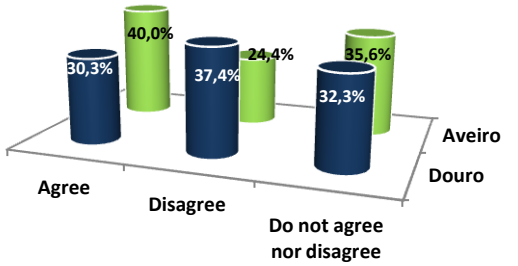
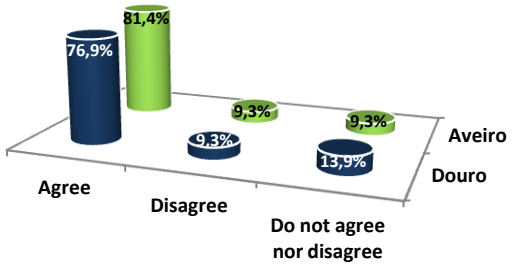
means and conditions in their regions that effectively support innovation in tourism. The results are very similar for both regions and demonstrated that 37% of respondents in Douro and nearly 36% in Aveiro agree that the regional environment provides firms with conditions to innovate. These values are lower than the percentage of firms that disagree (41% in Douro and 44% in Aveiro). Also, around 20% do not agree nor disagree (Table 6.18). Thus, there is a higher number of firms that do not feel that the region offers the optimal conditions for the development of tourism innovations.

The t-test for comparison of independent samples reported statistically significant differences in the responses given by innovative and non innovative firms (t=1,980; p=0,049). Curiously, out of the total innovators, only 31,4% agree that the region has the necessary conditions to innovate, while 44,7% disagree. Within the non-innovators, the percentage that believes that the necessary conditions for innovation are gathered is higher (54%) than those who disagree with it (36%).

Based on the literature review on territorial innovation models and on the impact of networks on innovation, it was concluded that firms that engage in collaborative processes with other organisations have a higher potential of increasing their innovative performance. Moreover, the existence of such relations helps to create robust and successful regional innovation systems. Bearing this in mind, a series of four statements were included in the survey in order to assess the perception of respondents on current situation and effectiveness of networks and their impact on tourism innovation (Table 6.20).

Table 6.20 – Perception on the regional networks and tourism innovation

Statement	Responses (%)
[QV.1] ***The relationships among the organisations located in my region help to create an innovation-friendly environment.***	

Statement	Responses (%)
[QV.2] ***Most successful tourist products (goods and services) recently introduced in my region result from the cooperation among different tourism agents.***	
[QV.4] ***The relations between my organisation and other regional organisations allow us to exchange knowledge and information that lead us to learning and innovation.***	
[QV.5] ***Universities and research centres located in my region provide tourism-related knowledge that meets the needs of my organisation.***	
[QV.9] ***I need to establish relationships with organisations located outside my region in order to access to knowledge and information that allow me to innovate.***	

Source: own construction

When evaluating the sentence "*The relationships among the organisations located in my region help to create an innovation-friendly environment*", the respondents of both regions present similar opinions, with a higher percentage agreeing with it. However, the difference between those who agree and do not agree is very small, which indicates that, in general terms, it cannot be concluded that the relationships among organisations effectively create an overall innovation-

friendly environment. At least, it may be said that this scenario is felt as positive by the 42% of respondents in Douro that agree with it, and for 39,6% in Aveiro.

Secondly, it was our intention to understand if the most successful tourism innovations resulted from the cooperation among different organisations. This is true for nearly half of the respondents in Douro (48,5%) and in Aveiro (49,4%). These results point towards the increased economic significance of tourism innovation developed in cooperation, against innovative tourism products and services placed in the market by tourism firms in the context of individual and atomistic processes. Those that do not agree or that have no opinion on the matter are equally distributed among the remaining half of respondents.

The perception that the relations between the regional organisations foster the transfer of knowledge that leads to innovation is more significant for firms located in Douro (66,4% agree) than in Aveiro (56,4%). This may indicate that Douro's tourism firms are more inclined to this type of collaborative process that results in collective learning and in innovative tourism products and services. However, the results for Aveiro are not low, as more than half agree with the statement.

When analysing if the tourism-related knowledge produced by universities and research centres meets the needs of surveyed firms, the results were significantly different between both regions. The importance and contribution of universities and research centres for tourism innovation is higher in Aveiro, where 40% of respondents agree with the statement, while in Douro only 30% agree. Furthermore, the percentage of firms that disagree is also much higher in Douro (37,4%) than in Aveiro (24,4%). The role of the University of Aveiro and GOVCOPP-UA (research unit) and their relations with regional firms may be thus highlighted.

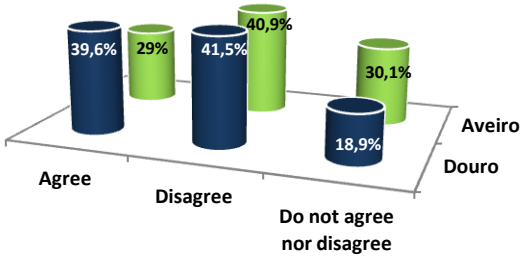
The final statement of this group is the following "*I need to establish relationships with organisations located outside my region in order to access to knowledge and information that allow me to innovate".* It was already mentioned that successful regional innovation systems are those that can combine dense internal (regional) networks with external contacts, as this way it is assured that new knowledge enters in the networks and is subsequently widespread due to close links and a dense structure. This is the statement with which the vast majority of respondents agree with when compared to others (81,4% in Aveiro and 77% in Douro). It is interesting to recall the results obtained when the respondents were asked to indicate the most important knowledge

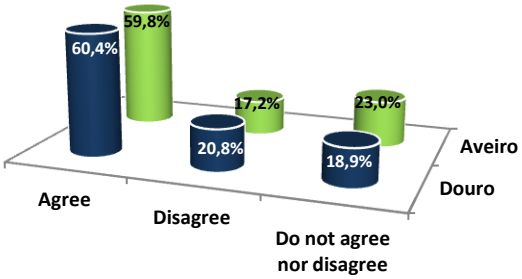
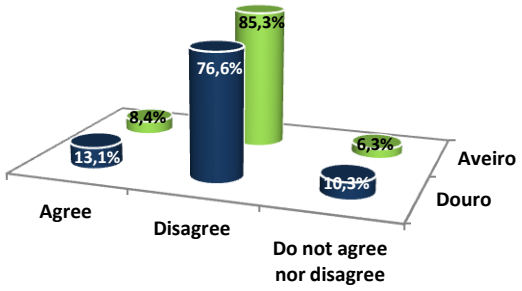
source in terms of geographical location of partners (Figure 6.48). In fact most tourism firms from Douro selected the interaction with external organisations, against regional or from other sectors, which validate the results obtained for this statement.

The final group of statements relates to the opinions of respondents on the impact of innovation in the development of tourism regions and the practices that may be implemented in this context (Table 6.21).

The first situation under analysis is if the growth of tourism organisations in the region fosters the increasing of cooperation among them and makes it a common practice. Aveiro, which is a more developed tourism destination, registers a low level of agreement with this statement, as only 29% of firms selected this option (against 41% that disagree). In Douro, nearly 40% of the respondents consider that the development of Douro as a tourism destination and the increasing creation of tourism firms are having a positive impact in collaborative practices. However, it should be noted that in Douro there is a proportion of firms that disagree (41,5%) that is slightly higher than those that agree. It seems, thus, that the growing of a tourism cluster is not effectively fostering cooperation at a large scale.

Table 6.21 – Perception on innovation and destination development

Statement	Responses (%)
[QV.6] ***As the number of tourism organisations grows in the region, cooperation among different organisations also increases and becomes a common practice.***	

Statement	Responses (%)
[QV.7] ***When the number of tourists stagnates or decreases, my organisation introduces an innovation in order to rejuvenate the destination and to attract more tourists.***	
[QV.8] ***The introduction of tourism innovations is only important when the destination is declining in its physical set and in numbers of tourists.***	

Source: own construction

From the literature review on the theories and models related to the development in general, and of tourism territories in particular (chapter 2), it was concluded that the introduction of an element of innovation makes societies evolve (Rostow, 1990) and, within Tourism Area Life Cycle (Butler, 1980), prevents destination from entering the stage of decline. Thus, it was important to analyse if tourism firms are introducing innovative products and services when the number of tourists declines, in order to rejuvenate the destination and attract more tourists. In both regions, about 60% of respondents engage in such practices (regardless of doing it in cooperation with others or by themselves). It is however worrying that nearly 21% of firms located in Douro and 17% in Aveiro do not develop any type of innovation with the objective of counteracting the downward trend in the number of visitors. Also, practically the same number of answers falls in the category: "do not agree nor disagree".

Despite it, almost all believe that the development of innovations in tourism is important at all times, and not only when the destination enters the decline stage. When facing the statement "*The introduction of tourism innovations is only important when the destination is declining in its physical set and in numbers of tourists*", 85,3% of respondents from Aveiro and 76,6% from Douro

say to disagree with the idea. There are, however, 13% of firms in Douro and 8,4% in Aveiro that agree with the sentence, that is, they believe that innovation is only important when the destination's physical set and number of visitors are declining.

6.4 Conclusion

This chapter focuses on the operation of tourism firms in what concerns regional tourism innovation practices. Within this objective, the analysis results from data collected from different types of tourism firms, which were segmented according to the typologies defined by the United Nations World Tourism Organisation (UNWTO, 2008) concerning tourism specific activities. The survey, of which resulted 206 valid questionnaires, was conducted in the NUT III regions of Douro and Aveiro.

The analysis was made according to the dimensions of regional tourism innovation systems' framework as identified in the literature review and that inspired the survey design, as well as the research objectives and hypothesis. Therefore, the results presented are organised according to: (i) the characterisation of the respondent firms; (ii) the innovation performance of tourism firms, which allows to draw some initial conclusions on the regions' overall performance as well; (iii) the patterns of networking and cooperation towards the development of tourism innovations; (iv) the role of regional knowledge infrastructure in the development of innovations in tourism; (v) the importance and contribution of regional specific features for territorial innovation dynamics; and (vi) the perception of tourism firms regarding the regional innovation environment and the role of innovation in destinations' development. The detailed results are presented throughout the chapter.

The data obtained and the analysis made allow drawing the overall conclusion that tourism firms innovate. Contrarily to what is argued by some authors, tourism is not a low or non innovative industry, and this can be confirmed by the percentage of tourism firms classified as innovators (84,4% in Aveiro and 77% in Douro). However, the pattern of innovation is different across regions, as well as the processes underlying the related dynamics.

One of the most important issues is concerned with the level of engagement in networks. It is found that there are no extreme differences between the regions in the number of firms that collaborate or participate in networks in order to develop innovations at destination level. There are, however, diverse patterns between the two regions in what regards the types of organisations selected as innovation partners, as well as in relation to their geographical location. For instance, tourism firms located in Douro are mainly focused on local and regional organisations, while in Aveiro the links established with national and international organisations outnumber internal connections. In what concerns the purposes of cooperation, the characteristics are similar, as both regions value the relations established with the purpose of sharing knowledge and developing new tourism products. Nevertheless, the selection of partners varies according the underlying purpose. Also, in most cases the cooperation with the group of tourism firms is more significant than with non-firm organisations, except when firms search for funding of the innovations and in the case of Aveiro, for knowledge creation, case in which tourism firms resort to the universities and research units.

The analysis of the role of regional knowledge for innovation provides interesting insights, namely that tacit knowledge sources are more important than codified knowledge ones. The local "sticky" knowledge (Morgan, 2001; Asheim & Isaksen, 2002), embodied in human resources, customers and personal and informal contacts has a higher importance then codified knowledge when tourism firm need to access to knowledge to innovate. In what relates to the geographical location of most relevant knowledge sources, there is an attempt to achieve a balance between the *local buzz* (knowledge resulting from regional interactions) and *global pipelines* (knowledge accessed through external links). Bathelt et al. (2004) argue that the both types of interactions are important for the creation and transfer of codified and tacit knowledge, endowing firms that achieve this equilibrium with particular advantages to the development of innovations.

As far as the innovation environment is concerned, there is not a consensus between those who agree that their regions offer the necessary overall conditions to innovate, and those who disagree with that. The relationships established among organisations do not seem to foster an innovation-friendly environment as well. However, most firms agree that successful tourism products already placed in the market resulted from collaborative processes. The establishment of relations with other regional organisations is important to access knowledge that allows

innovating, but a higher share of firms agree that relations with organisations located outside the region brings more fruitful contributions.

Finally, innovation is understood as a determining factor in preventing the decline in the number of tourists, and tourism firms do engage in processes resulting in innovation in order to do so, but they also believe that innovation is not only important when the destination stagnates or starts to decline in the number of visitors or physical setting, but it is a practice that should be adopted in all stages of tourism life cycle in order to maintain or increase the competitiveness of tourism firms and destinations.

Chapter

7

Institutional networks and regional tourism innovation systems

7.1 Introduction

As mentioned in the methodology chapter, two distinct complementary empirical studies were carried out. The first includes a survey to tourism firms located in Douro and Aveiro, with the main objective of characterising tourism innovation performance and practices at regional level conducted by those firms. The results of this study are presented and analysed in the previous chapter.

However, regional innovation systems go beyond the development of networked innovation by firms. As concluded in chapter 4, the institutional dimension is endowed with an extreme importance in shaping and influencing the behaviour of regional firms and in providing the necessary and optimal conditions (tangible and intangible) for innovation to occur. Therefore, a second empirical study was conducted, directed to regional institutions, in order to analyse their networking practices towards the engagement in innovation activities and/or the support provided to the region within this context. As Amin and Thrift (1995) refer, regional institutional thickness fosters the clustering of economic activities as well as stimulates entrepreneurship and, thus, innovation. Institutional thickness determines the potential of development of a given territory, in which innovation has a significant role.

This chapter presents the results of the survey applied to regional institutions. It is a sociometric study that, resorting to several metrics of social network analysis, characterises the dynamics of institutional innovation networks in Douro and in Aveiro. Firstly, a general overview and characterisation of the overall networks is made, in terms of their dimension and the actors comprising them (section 7.2). This is followed by the analysis of centrality of individual actors (section 7.2.1) and the networks' cohesion patterns (section 7.2.2). The analyses subsequently conducted are more refined and specific. Sections 7.2.3 and 7.2.4 deal with the collaboration patterns according to the geographical location of actors and the type of organisation. The structural holes and brokerage positions are analysed in section 7.2.5. Afterwards, a comparison was made between the overall networks and the regionally-based networks (section 7.3). Small-world networks are, according to the literature review, the most suitable structure for the development of innovation. This metric is applied to the networks of Douro and Aveiro in section 7.4. Finally, and considering the innovation specific activities, five sociograms were built for each activity, in both regions. The objective was to understand the role that institutional networks play

in knowledge creation, knowledge sharing, new product development, new process development and new marketing strategies. The main sociometric measures are applied to these social structures and a comparison is made between them and between both regions (section 7.5).

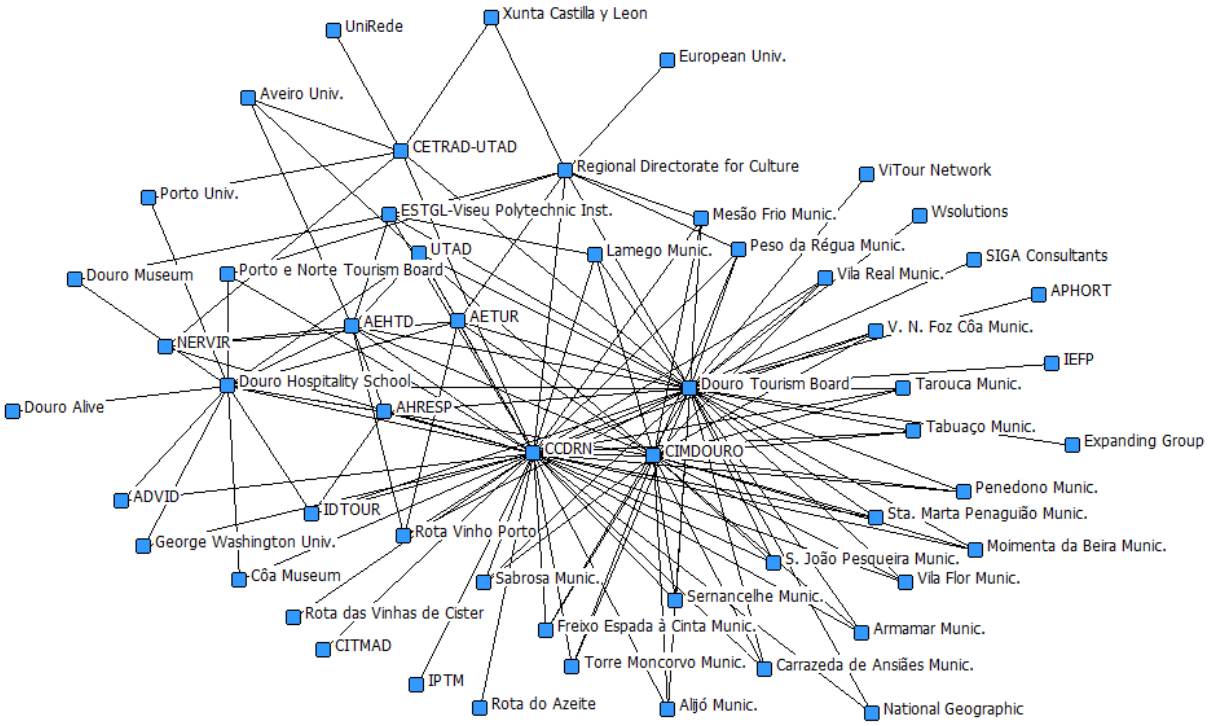
7.2 Patterns of institutional cooperation for regional tourism innovation: social network analysis

As mentioned, this chapter aims at analysing the tourism institutional networks of Douro and Aveiro regions. By using this approach, it is possible to understand the institutional patterns of cooperation within tourism innovation processes, and allows concluding on the innovation environment of both regions, which obviously influences the overall conditions and support given to tourism firms to develop their innovations. In this way, it is possible to analyse regional tourism innovation systems from the perspective of tourism firms (seen in previous chapter) and of the institutional (governance) component, which is the aim of the present chapter. Cooke (2001) acknowledges the importance of assuring public innovation support systems, alongside stronger institutional and organisational support from the private sector.

Table 7.1 – Summary of main metrics computed for the whole Douro and Aveiro Tourism Innovation Networks

	Douro Real Network	Douro Random Network	Aveiro Real Network	Aveiro Random Network
Order (nodes)	55	55	87	87
Size (ties)	274	274	314	314
Density	0,092	0,092	0,042	0,042
Average Degree	4,98	4,982	3,61	3,609
Network Degree Centralisation	69,22%	9,07%	44,5%	6,18%
Diameter	4	5	5	8
Average Path Length	2,134	2,618	2,591	3,505
Clustering Coefficient	0,566	0,091	0,677	0,045
E-I Index$_{org}$	-0,182	0,328	0,108	0,388
Internal Ties	162	x	140	x
External Ties	112	x	174	x
E-I Index$_{geo}$	0,212	0,390	0,643	0,529
Internal Ties	108	x	56	x
External Ties	166	x	258	x
Small World Q	7,63	x	20,35	x

Figure 7.1 –Douro institutional innovation network



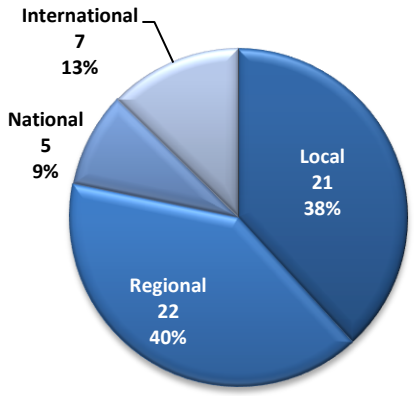
Source: own construction

The institutional network of Douro (Figure 7.1) has a size of 55 actors involving 274 links. In Aveiro, it is registered a total of 87 actors with 314 ties linking them (Figure 7.4). Aveiro presents a larger network in terms of institutional actors engaged in innovation processes and of links connecting them. However, if one analyses the mean links (average number of links per actor), Douro is better positioned, as its nodes present an average of 4,98 links each, while Aveiro only registers 3,61. In an initial and detached approach, this places Douro in an advantageous position, however, it is important to analyse if the links result from nonredundant contacts, which will influence the networks' efficiency (Burt, 1992). This issue is carefully addressed further in this chapter.

In terms of the composition of the networks, figure 7.2 shows that Douro has a higher number of local and regional actors. In fact, these groups together represent 78% of the overall network.

Only 12 nodes are national[29] or international. This unveils a low dynamic related to outwards orientation of the Douro tourism innovation network.

Figure 7.2 – Geographical scope of actors in Douro innovation network

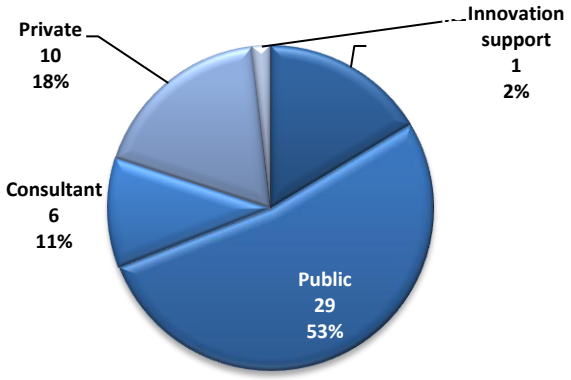


Source: own construction

The types of organisations that compose the network are also unbalanced, as 53% are public agencies. Only 18% are private organisations and 16% are knowledge producers. Consultants and innovation support agencies register even lower values. This situation, despite not being the most advantageous, may be explained by the fact that Douro is at its early stage of tourism development, which usually requires a higher intervention of government and public organisations in order to fund new tourism projects and to engage in the destination planning, organisation and promotion. They perform a leverage role with the aim of fuelling the intervention of private sector organisations and attracting investments into the area.

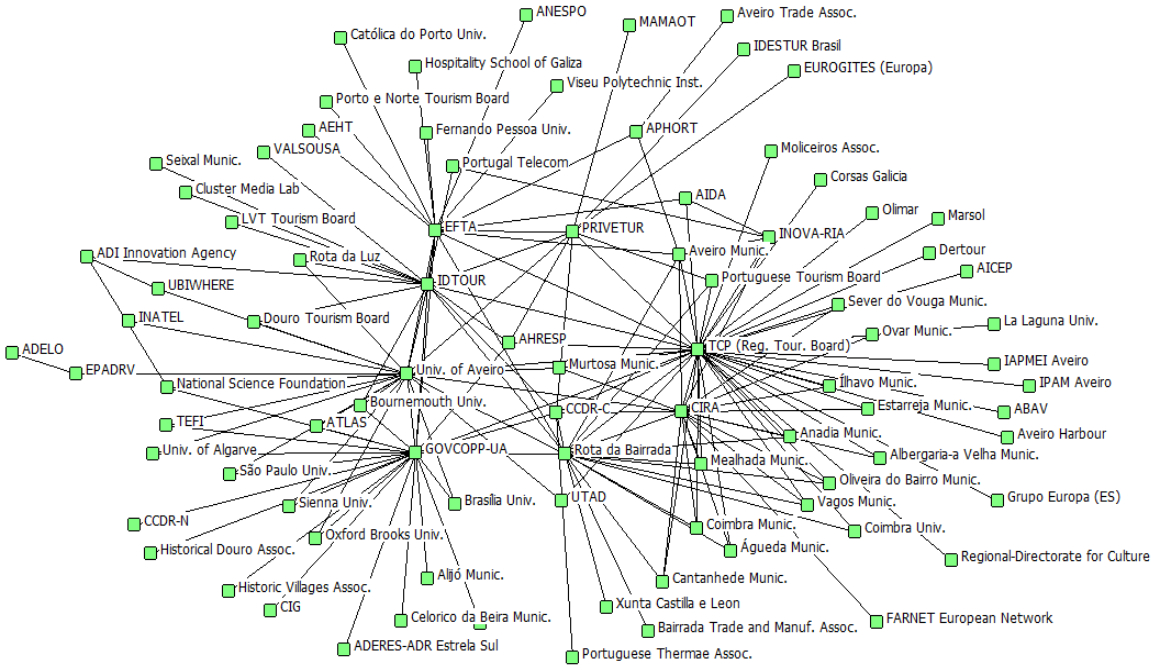
[29] Within the analysis undertaken in this chapter, 'national' means that the organisation operates at national level or is located in a different Portuguese region.

Figure 7.3 – Organisational type of actors in Douro innovation network



Source: own construction

Figure 7.4 –Aveiro institutional innovation network

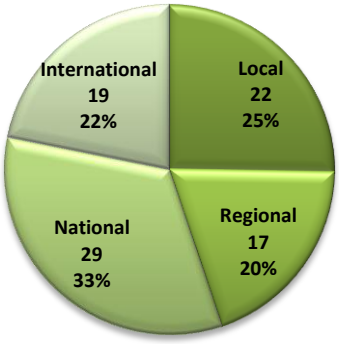


Source: own construction

The different groups regarding the geographical scope of actors in the Aveiro network present a similar value, which means that nodes are somewhat well distributed and therefore may indicate an interesting dynamic among all geographical levels (Figure 7.5). However, the group comprising national actors stand out with 33% of the total. Together with the international actors, both these

groups represent 55% of the entire network. This situation is adequate to assure the access to new knowledge and resources entering the network and to prevent a situation of lock in and regional decline. The difference to the network of Douro is quite significant. The more advanced stage of development that characterises Aveiro as a tourism destination may certainly influence the presence of these actors within tourism innovation processes.

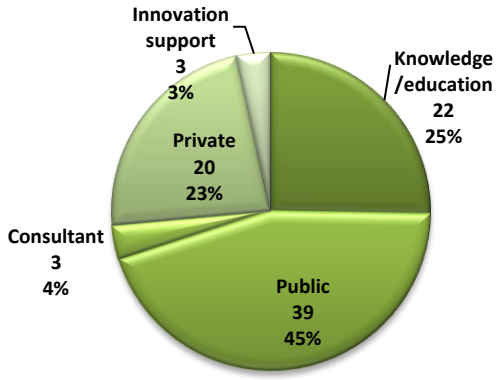
Figure 7.5 – Geographical scope of actors in Aveiro innovation network



Source: own construction

When analysing the different types of organisations, public agencies stand out with 45% of total. This group is followed by knowledge and education organisations (25%) indicating that scientific knowledge, education and training in tourism are valued and perform a significant role in regional tourism innovation. New knowledge is then created and disseminated within the network, fostering innovation, which, alongside the high number of international and national organisations (as seen above) is relevant for constant and regular innovation, especially if developed in cooperation. Private entities account for 20% of all nodes. Similarly to Douro, consultants and innovation support agencies present a lower number.

Figure 7.6 – Organisational type of actors in Aveiro innovation network



Source: own construction

The public sector is well represented in both networks and, as it will be seen later on this chapter, performs a crucial role in networked tourism innovation. This is especially important for tourism destinations because the industry is mainly composed by SMEs. According to Baggio and Cooper (2010), tourism SMEs are frequently averse to knowledge and thus the intervention of public agencies is necessary to advance cooperation and networks at destination level and to advance the creation of knowledge spillovers.

7.2.1 Position of individual actors: analysis of centrality

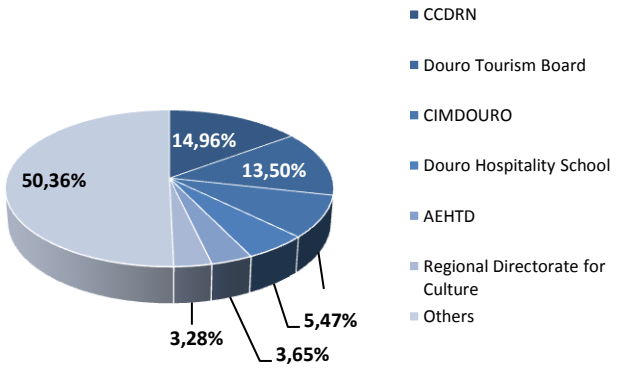
The analysis of centrality is the most widely used method in characterising networks' positional data (see Chapter 5). Central actors are more prominent and with higher access to resources, information, knowledge, as well as are endowed with more control of the network and are less dependent on other actors. In order to obtain a deeper level of knowledge on this matter, Freeman (1979) proposes the use of three complementary measures: degree, betweenness and closeness. Network centralisation is also used due to the fact that, being a relative measure, it allows the comparison of the two networks. Figures 7.1 and 7.4 present the overall sociograms for the institutional networks of Douro and Aveiro, which graphically supports the results presented in the following sections.

7.2.1.1 Degree centrality

Actors with high degree centrality are the ones who have the largest number of direct connections and therefore are located in more central positions in the network. Usually, these organisations have a higher status, frequently related to leadership. Empirical evidence supports that highly central actors are in a good position to innovate. Liu et. al (2005) acknowledge the existence of three mechanisms underlying this situation: (i) the access to a significant quantity and diversity of resources; (ii) the location at the confluence of several information and knowledge sources; and (iii) the fact that they are endowed with a status that impels them to innovate first, instead of following what was already developed by others. There is a significant relationship between degree centrality and innovation. Organisations innovative capacity and performance increase with degree centrality.

When analysing the individual positions of institutions that are part of the Douro innovation network, six actors stand out for their degree: (i) the North Regional Coordination and Development Commission (CCDR-N), with 41 direct nodes; (ii) Douro Regional Tourism Board, which accounts for a degree of 37; (iii) CIMDOURO - Association of Municipalities of Douro has direct connections with 24 other institutions within innovation processes; (iv) Douro Hospitality School is engaged in cooperation with 15 organisations; (v) AEHTDOURO – Association of Businesses of Hospitality and Tourism of Douro registers a degree centrality of 10; and (vi) the Regional-Directorate for Culture of Northern Portugal presents 9 direct cooperation partners. These actors reach nearly half (49,64%) of total degree centrality of Douro tourism network.

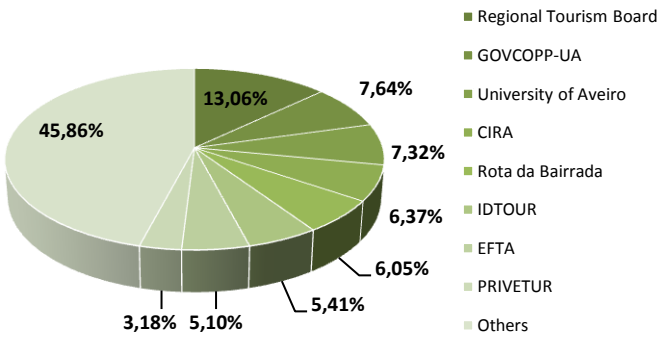
Figure 7.7 – Actors with highest degree centrality in Douro network



Source: own construction

In Aveiro, one may highlight the position of (i) the Regional Tourism Board TCP (degree centrality of 41); followed by (ii) GOVCOPP (Research Unit in Governance, Competitiveness and Public Policies of the University of Aveiro), which presents direct links to 24 nodes; (iii) the University of Aveiro, engaged in cooperation towards innovation with 23 institutions; (iv) CIRA - Association of Municipalities of Aveiro presents a degree of 20; (v) Rota da Bairrada (Wine tourism Business Association) with 19 direct nodes; (vi) IDTOUR (R&D tourism spin-off company) registers a degree centrality of 17; and, finally, (vi) EFTA - Aveiro Tourism Training School (16 nodes) and (vii) PRIVETUR (Rural Tourism Association) with 10 direct actors. As observed in figure 7.8, the most central actors represent a share of 54,1% of total degree centrality.

Figure 7.8 – Actors with highest degree centrality in Aveiro network



Source: own construction

These actors, as a result of their high centrality, are the most active in their networks, acting as "hubs". They have access to more information, knowledge, resources and are likely to exert more control and influence among other actors, as they can reach a larger number of individuals. They are also less dependent on a particular actor. Therefore, they are in an advantageous position for knowledge acquisition and sharing and to promote collective learning, which are fundamental processes underlying innovation. There is, thus, a significant correlation between degree centrality and innovation. The more the knowledge an actor has access to, the higher the potential to generate new ideas and innovations. These are the most powerful actors.

These nodes, being the most connected ones, are also the most likely to acquire new connections as other actors join the network (Degenne & Forse, 1999; Gay & Dousset, 2005), as they present more relational activity. Conversely, actors with a lower degree of centrality are peripheral and endowed with less activity because they are isolated. Nonetheless, an actor that is peripheral in a network may be central in another network, the reason why he must not be undervalued. He may be in the position of a broker, acting as an intermediary between two different networks.

It is interesting to observe the dissimilarities between the networks of Douro and Aveiro in what concerns degree centrality: while in Douro the most central and powerful actors are mainly public/governmental, in Aveiro their counterparts are knowledge producers and education institutions, such as GOVCOPP Research Unit, the University of Aveiro, Tourism Training School (EFTA) and IDTOUR which, despite being a consultancy firm, it is a spin-off located in the University of Aveiro and focused on tourism applied R&D.

It is worth noting, however, that these conclusions cannot be drawn in isolation. Most central positions may not be the better or more advantageous ones. It is also important to analyse where these connections lead to and how they link unconnected nodes. Moreover, the existence of too many ties may consume a great deal of time and energy, preventing these actors to engage in new connections and eventually lead them to lock-in.

7.2.1.2 Betweenness

Betweenness centrality may be considered as a measure of intermediation. It regards not only the direct ties, but also the indirect ones. As argued by Freeman (1979), it reflects the control over and access to the flow of resources, namely knowledge and skills and the diffusion of innovations. Within this context, the most powerful actors are those who connect nodes or cliques that would otherwise be disconnected, i.e., the extent to which he “lays between” other nodes, even if he does not present a high degree centrality. Actors with high betweenness act as brokers and have the ability to control the communication and the outcomes in a network. They also present a higher innovative potential, as they access to varied information and are less restricted by group norms and rules.

In Douro, betweenness ranges from 0 to 610,4, presenting a high variation (std. deviation of 109,7 to a mean betweenness of 30,6). Therefore, there are a few actors who register significant betweenness levels when compared to the others in the network. Thus, one is facing a network composed by actors with high betweenness power. The main difference to degree centrality is that AEHTD (Association of Tourism and Hospitality Businesses of Douro) has less power as a broker that as a central actor, as it does not figure out as having a high betweenness. Instead, the Research Unit of the University of Trás-os-Montes e Alto Douro (UTAD) appears as the fourth most powerful. Thus, intermediation and brokerage is carried out, to a large extent, by public/ government organisations, with knowledge and education institutions acquiring significant positions in what concerns the flow of resources, especially knowledge, which makes sense in an innovation network supporting a regional innovation system.

Table 7.2 – Actors with highest betweenness in Douro and Aveiro networks

Douro Network		Aveiro Network	
Institution	**Betweenness**	**Institution**	**Betweenness**
CCDR-N	610,37	Regional Tourism Board	1701,38
Douro Tourism Board	537,29	GOVCOPP-UA (Research Unit)	906,41
Douro Hospitality School	146,27	University of Aveiro	792,15
CETRAD-UTAD (Research Unit)	106,55	EFTA (Training School)	720,31
CIMDOURO (Assoc. of Municipalities)	100,53	IDTOUR	556,40
Regional-Directorate for Culture of Northern Portugal	86,32	Rota da Bairrada (wine tourism assoc.)	389,87
		PRIVETUR (rural tourism assoc.)	272,09
		CIRA (Assoc. of Municipalities)	232,31

Source: own construction

The values range between 0 and 1.701,4 in the Aveiro network, presenting an even wider interval of betweenness levels. For a mean betweenness of 68,4, the std. deviation is of 241,5. In fact, both networks are rather different in betweenness patterns: while in Douro, despite the variation, almost all actors present some betweenness centrality (only 32,7% have 0), in Aveiro the opposite occurs, as the intermediation is concentrated in only a few actors (77% have 0 betweenness). One may conclude, therefore, that power is much more distributed in Douro, that is, the majority of institutions do not depend on a small group in order to be connected or to access knowledge, skills and other resources, while in Aveiro the power belongs to a reduced clique, on which most actors depend on to access resources and knowledge. So, knowledge sharing, collective learning and innovation development is constrained by a few actors, which are rather the same presenting

the highest values of degree centrality. It is also interesting to note that the Commission for Regional Coordination and Development in Northern Portugal has the primary role in both degree and betweenness centrality in Douro, and its counterpart in Central Portugal does not occupy a significant position in the Aveiro tourism innovation network, which may be explained by the fact that Douro is in an earlier stage of tourism development and, therefore, more dependent on public and government agencies, especially for innovation funding, marketing, promotion, new products and processes development.

Due to the fact that Douro is in an initial stage of development, there are several groups involved in the development of tourism, but are more fragmented. Aveiro, on the opposite, is in a more advanced stage. At this point, a few organisations lead and promote the development process, concentrating a higher number of links.

7.2.1.3 Closeness

Closeness centrality is measured by the sum of distance of an actor to the totality of actors in the network. It is an important indicator of trust and proximity among the network members, which is a precondition for the development of territorial innovation, by promoting joint endeavours such as knowledge creation, sharing and collective learning. Tacit knowledge finds the best way to be spread among actors with higher closeness levels. These actors are potentially more innovative as they are recipients of new knowledge from other actors; moreover, they are likely to get fresh information sooner and to more quickly interact with all other nodes. Subsequently, they are also more embedded in the network (Uzzi, 1997) and have a higher ability to prevent control by other nodes. Hence, an actor may have few ties, but these may allow him to access a great number of other nodes more quickly than others, because he has the shortest path to all other nodes. While high betweenness means control of resources and actors, closeness represents the access to them.

By following Freeman's approach, closeness centrality was measured using the method of the geodesic path distance (the sum of the lengths of the shortest paths from each node from all other nodes) (Freeman, 1979; Hanneman & Riddle, 2005). Thus, the results will present, in fact,

the "farness" of each actor, reason why the most central nodes will be the ones presenting the lowest values (higher distances mean lower closeness centrality)[30].

There are not significant differences in the Douro's region most central actors. The Commission for Regional Coordination and Development of Northern Portugal continues to appear in the first place, with the lowest registered farness (the sum of geodesic distances to all other actors is of 67), followed by Douro Tourism Board (71), CIMDOURO Association of Municipalities (93) and Douro-Lamego Hospitality and Tourism Training School (96). However, two tourism business associations emerge presenting relevant closeness within the network: AETUR (Associação de Empresários Turísticos do Douro e Trás-os-Montes) and AEHTD (Associação de Empresários da Hotelaria e Turismo do Douro), both with 101 of total geodesic distances to the rest of the nodes, occupying the 5th and 6th position.

In Aveiro, a similar situation is also observed. Closeness centrality reflects the results of the previous computed centrality measures. The Regional Tourism Board for Central Portugal continues to occupy the most central position, this time by being closer to all other actors, than any other node: the sum of its geodesic distances reaches 133. This value (as well as the other closeness values) is significantly higher than the one verified for Douro, which is explained by the size of the network, which has more nodes and ties[31].

The University of Aveiro and its Research Unit (GOVCOPP), also maintain their central importance, with a total of, respectively, 151 and 154 distances towards network members. Rota da Bairrada wine tourism association (158), the R&D spin-off IDTOUR (158) and the training tourism school EFTA (159) are close to these knowledge producers.

While in Douro the most prominent actors are government institutions and business associations, it is worth noting that, in Aveiro, knowledge and research organisations unveil significant importance by being highly proximate to all the network members. This situation is favourable for new knowledge dissemination throughout the entire network and to the development of innovations based on it.

[30] This measure can also be computed using the method of the sum of reciprocal distances, which will provide the exact same results, although presenting values of closeness instead of farness.
[31] Centrality measures are highly dependent on network size.

7.2.1.4 Network centralisation

All the measures calculated for the real whole network undergone through a process of comparison of the same measures for a random network of the same size, in order to develop expected values of reference. This allows establishing if a specific result is considered to be high or low. This methodology was applied by Baggio, with the aim of providing "*useful information on the differences between the network structures found and a reference model (null model) (...) in which the links are distributed randomly*" (Baggio, 2008, p. 204).

Network centralisation is a useful metric when we are comparing different structures, as it is a relative measure. The network centralisation expresses the degree of inequality of variance in the network under analysis as a percentage of that of a perfect star network of the same size. Freeman (1979) used the star network model because this is the most unequal possible network for actors (chapter 5, section 5.3.4.2).This index's values may range between 1, when all actors interact with only one central actor (star graph) and 0 when there is no variation and all actors present equal degrees (regular lattice ring). If the network centralisation is high, one may conclude that there is a large extent of concentration in the whole network and, thus, the power of actors is unequally distributed. The lower the centralisation, the larger is the number of actors sharing similar positions.

The Douro network presents a centralisation of 69,2%, an extremely high value that confirms what was already concluded in previous analysis of degree centrality: there are few prominent actors much more powerful that others and therefore, positional advantages are unequally distributed. This is even more remarkable when we compare it with the result of the random network, which presents an expected value of 9,1%.

The centralisation of Aveiro's network, although still clear, is significantly lower than the one of Douro: 44,5%. It is possible to conclude that there are more prominent and powerful members in Aveiro than in Douro, and positional advantages are more fairly distributed. However, it also presents a wider difference in relation to the value computed for the respective random network, which is of 6,18%.

Both networks present a significantly higher centralisation of power than would be expected, considering their size in terms of nodes and ties. Thus, the capacity of tourism innovation is highly concentrated in a few organisations. This situation may be favourable to the coordination of network members, for sharing the same principles and objectives, and to control and undertake the necessary activities towards the development of innovation, especially in an industry with a high diversity of actors and businesses. Central actors encompass the ability of facilitating and promoting the interaction among the actors in the network (Granovetter, 1973). Besides, decentralised structures are more flexible and better adjusted to changes in the external environment, in opposition to hierarchical and bureaucratic arrangements (Costa, 1996) and thus obtain a better innovation performance (Chesbrough & Teece, 1996).

As depicted by Liu et. al (2005) when analysing network centrality and innovation diffusion, highly central actors are usually innovators and less central actors may play the role of "imitators". Bearing this in mind, central organisations should be conscious of this situation and use their advantageous position to foster the innovation at systemic level, to promote the exchange of knowledge (tacit and codified) and to fuel processes of interactive and collective learning.

7.2.2 Network connectivity and cohesion

7.2.2.1 Density

Density refers to the number of direct ties between nodes in relation to all possible ties in the network. It is the extent to which all members are connected to each other. Thus, it informs several phenomena, namely the strength of the relations, the pace through which knowledge spreads in the network, and the levels of social capital or social constraint (Hanneman & Riddle, 2005). Dense networks bring a number of advantages for regional innovation systems as they develop a set of dynamics that foster innovation. Dense networks present interesting levels of trust among their members, facilitate the identification with the group and subsequently the alignment with common norms, interests and objectives. Coordination of the members and of the collective endeavours towards the development of tourism innovation is easier within this type of

structure. Knowledge, especially the tacit, flows effortlessly which, alongside the above mentioned condition, creates the appropriate scenario for collective learning and innovation.

However, despite the benefits that high density can bring, it is important to be aware that if there are too many redundant ties, an increased relational energy is spent, which could otherwise be channelled to making new connections. A situation of a dense network with no external linkages can lead to lock-in, as the knowledge that circulates within the structure remains the same, with no introduction of new knowledge, which hampers innovative performance.

The overall institutional tourism network of Douro registers a density of 9,2%, i.e., only 9,2% of all possible connections are effectively established among the actors. Aveiro encompasses a lower density, as only 4,2% of all possible links are present. Despite this values appear to be quite low, one may refer the study of Elba and Fiji tourism networks, whose density was respectively of 0,3% and 0,2% (Baggio et al., 2002; Scott, Baggio, et al., 2008) or of four cases in Australia, where the results are closer to the ones obtained in the present research, ranging between 6% and 14% (Scott, Cooper, et al., 2008).

However, if this analysis is complemented with the removal of all actors that are located outside the region (external actors) and examine both regionally-based networks, connection levels increase significantly: Douro regional network has a density of 12,4% and Aveiro almost equals it with 12%.

7.2.2.2 Distance

The number of effective ties also enables the measurement of the average degree of the network, that is, the mean number of links per actor. As expected, in result of its density, Douro average degree is higher than Aveiro: while the actors of the former network are engaged in 5 connections, tourism institutions in Aveiro only present 3,6 average links. These values are levelled up when considering exclusively regional networks, as regional tourism institutions of Douro have 5,32 links among them, and those located in Aveiro are tied to an average of 4,56 regional actors. So, when excluding external actors, the number of connections increases, which reflects the embeddedness of institutions in regional innovation.

Both the average path length and the diameter are proportional to the number of ties of a network. The diameter is the largest geodesic distance in a connected network. In Douro, there is not a single actor at a distance of more than four steps from any other, which reflects a compact network. This is lower than the one registered for a random network of the same size, whose results returned an expected diameter of five. Aveiro's network diameter is wider, with a largest geodesic path of five. However, it is significantly lower than the respective random network, in which the longest path is of eight ties.

The geodesic path is the optimal (that is, the shortest or most effective) connection between two actors. When the geodesic path matrix demonstrates multiple shortest paths, two situations are likely to occur: (i) knowledge flow will not be interrupted, as there are many channels that assure it, and (ii) it is not likely that any of the nodes will be positioned as a powerful broker, as there are many efficient ways to connect to other actors (Hanneman & Riddle, 2005). Both in Douro and Aveiro, actors with longer geodesic distances are located in other countries or other Portuguese regions.

An important fact to be aware of is that, regardless of the distances, given that both networks are fully connected, the flow of knowledge is likely to reach every node and therefore engage all the actors in collective learning and tourism innovation.

7.2.2.3 Maximum Flow

Geodesic paths provide an interesting approach in measuring the distance between nodes and for the entire network. However, there are other methods that consider all connections rather than just the more efficient ones. Maximum flow (or line connectivity) evaluates whether the connection between actors is strong or weak, according to the number of pathways (alternatives) that allows one to reach the other. Actors with higher maximum flow levels also have high betweenness centrality, as both concepts are related. The higher the number of alternatives that an actor has to reach another, the stronger is their connection to the network and the greater is the likelihood that information will flow between them (Hanneman & Riddle, 2005).

In the Douro region, almost every actor presents more than one alternative to reach any other in the network, which ensures that resources in general, and knowledge in particular (whether codified or tacit) flow easily and with no apparent obstacles among them. However, there are 13 actors (corresponding to 23,6% of total nodes) that have only one connection to the rest of network members. These are: the Expanding Group, Institute for Employment and Training (IEFP), APHORT (Portuguese Hotels Association), Siga Consultants, IPTM (Institute for Ports and Maritime Transport), CITMAD (Centre for Innovation of Trás-os-Montes and Alto Douro Region), Route of Olive Oil, WSolutions Consultants, ViTour network, European universities, Douro Alive and Cistercian Vines route. These organisations include both regional and external actors [32]. Despite the fact that these actors present weak connections within this network, it is important to consider that they may play a central role in other networks, and therefore can be important sources of introduction of new knowledge and foster the development of tourism innovation.

In what concerns the actors demonstrating a higher number of alternative paths, one can pinpoint the Douro Tourism Board, the Northern Regional-Directorate for Culture, the Hospitality and Tourism Training School, CCDR-N (North Regional Coordination and Development Commission), CIMDOURO (Douro Association of Municipalities) and the hospitality and tourism businesses associations AETUR and AEHTD. It is worth referring that Douro Tourism Board has 31 different alternatives of reaching CCDR-N; 24 for reaching CIMDOURO; 14 ties mediate its relationship with the Hospitality School; and it has are 10 possible ways to access AEHTD business association. CCDR-N has also 24 alternatives to get to CIMDOURO and 14 to the Hospitality School. These actors are the ones presenting stronger connections within the network and thus they probably access the same resources, knowledge and information.

The patterns of maximum flow observed in the Aveiro's whole network are quite distinct from Douro. Out of the 87 actors that comprise this network, 43 enclose one single connection to every other node. This means that almost half of them (49,4%) have only one way of obtaining information from all other actors and are, therefore, in a vulnerable position. Most of them are located outside the region. Conversely, the organisations placed in more robust positions are GOVCOPP research unit, Bairrada Route, the University of Aveiro, the Centre Regional Tourism Board, CIRA (Association of Municipalities), IDTOUR (consultancy spin-off), and Aveiro Tourism

[32] These organizations apparently may not be relevant for the overall innovation process. However, they are important to the extent that they provide information, knowledge and resources.

Training School (EFTA). The alternatives for these actors to reach each other range from 9 to 19. It can be observed that IDTOUR plays a very important role, as it is the responsible for establishing the connection between several actors with a line connectivity of 1 with the rest of the network members. It plays a central role as a broker in the sharing and dissemination of information and knowledge throughout the tourism innovation network.

7.2.2.4 Point Connectivity

Point connectivity informs on the number of nodes that would have to be removed in order for one actor no longer to be able to reach another. To some extent, the results are similar to the ones provided by the maximum flow measure. However, this analysis focuses on actors rather than on links between them. This can enlighten on the robustness of the network and also on the vulnerability of specific actors, as well as on relations of high dependency. If an actor presents a single connection, in order to access any type of resource, he has only one option. If a single organisation does not pass him the knowledge that flows in the network, he will not receive it from any other node (Hanneman & Riddle, 2005; Wasserman & Faust, 1994). This actor is, thus, highly dependent on a single organisation which, if removed, would isolate him from the whole network. It is extremely vulnerable to this type of dynamic, which hinders the engagement in collective learning processes and joint innovation endeavours.

In what concerns the institutional network of Douro, there are some vulnerable actors, as they present a single or very few connections com any other actor. One can highlight mainly international and national level organisations, such as the ViTour Network, international universities, the network of Latin-American universities, APHORT (hotel and restaurants national association), IEFP (national institute for employment and training) and IPTM (Institute for Ports and Maritime Transport). At regional level, it is curious to note that organisations representing cultural products and services are extremely dependent on few actors, namely the Douro Museum, the Côa Museum, the Olive Oil Route and the Cistercian Vines route.

In Aveiro, less connected nodes refer to public organisations, business associations and higher education organisations located outside the region (at national and international level), with the

exception of foreign universities presenting links to the University of Aveiro, which are more well connected.

Actors that have many connections are not subject to this tenuousness and vulnerability. They are less dependent, have access to more resources from different actors and, subsequently, to diversified knowledge sources, improving their stock of (new) knowledge and their innovation performance. When two actors present many pathways linking them, they have high connectivity because there are multiple ways for knowledge and information to reach from one to the other.

These organisations correspond to those presenting higher centrality levels. In Douro, the nodes that stand out are the North Regional Coordination and Development Commission (CCDR-N), the Douro Regional Tourism Board, CIMDOURO - Association of Municipalities of Douro, Douro Hospitality School, AEHTDOURO – Association of Businesses of Hospitality and Tourism of Douro, AETUR – Association of Entrepreneurs of Douro and Trás-os-Montes and the Regional-Directorate for Culture of Northern Portugal.

Aveiro presents similar patterns, with regional organisations positioned at the top of the connectivity ranking: Central Portugal Regional Tourism Board, Bairrada Wine Route, CIRA - Association of Municipalities of Aveiro Region and PRIVETUR (Rural Tourism Association) can be highlighted. However, one significant difference should be pointed out, as the University of Aveiro (a leading knowledge producer organisation) presents one of the highest point connectivity levels, which means that there is an extremely high potential for scientific knowledge to be transferred within the system. It is also worth referring that most connected actors' links occur among themselves in both regions (we are, therefore, facing a clique situation in both places).

7.2.2.5 Clustering Coefficient

A cluster is defined as a group of high density within a network, referring to nodes that are more similar or proximate to one another than they are to other nodes. They are defined according to their contiguity and their separation from other clusters (Scott, 2000). Distance measures allow analysing the relative proximity between nodes and then to group them into homogeneous clusters, reason why they are frequently used in regional analysis (Costa, 1996).

According to Costa (1996), cluster analysis presents great potential for tourism research, for instance in what concerns defining tourism regions/ destinations, designing homogeneous tourism products, segmenting markets, etc. In sociometric analysis, it allows to identify which organisations are closer to each other and therefore operate as cliques in terms of knowledge transfer, collective learning and innovation development, as well as peripheral organisations.

The **clustering coefficient** (CC) measures the extent to which some actors present more activity, with many ties around their alters, while other ego networks present fewer ties. Formally, the overall graph clustering coefficient represents the average of the densities of the neighbourhoods of all of the actors (Hanneman & Riddle, 2005; Koput, 2010).

Aveiro presents a higher clustering coefficient than the Douro region, namely 0,677 against 0,566. This means that the neighbours of that network are better connected than those of Douro, and that the actors located in Aveiro have a higher probability of being connected to each other. Curiously, when comparing the real network coefficients with the computed random networks, the results are the opposite: Douro reaches 0,091, which is higher than the 0,045 of Aveiro.

Table 7.3 – Clustering Coefficient in Douro and Aveiro Real and Random Networks

	Real Network	Random Network
Douro	0,57	0,09
Aveiro	0,68	0,05

Source: own construction

The higher the clustering coefficient, the closer actors are to each other. Their relationships are thus more embedded, knowledge is easily widespread and there may be a higher level of trust among individuals and organisations, raising the potential for collective learning and for the development of networked tourism innovation. It also builds a more robust and less vulnerable network. Bearing this in mind, one may conclude that Aveiro's institutional network is in a more favourable position, as it is more clustered than Douro. Despite this, both networks present high levels of clustering which unveils a pattern of cohesive networks.

Another level of analysis concerns the clustering coefficient of each individual actor. UCINET provides both the individual clustering coefficient and the number of pairs in each actor's

neighbourhood. This analysis should be made cautiously. Some actors may present a high clustering level, but if they have few neighbours, this would not have the same repercussions than an organisation with a lower individual clustering coefficient, but placed in a very large neighbourhood.

In the Douro network, some actors stand out due to their high clustering level. IDTOUR has 6 pairs of neighbours and is connected to all of them, with a CC of 100%. Similarly, AHRESP has 10 possible connections and 90% of them are present, as well as the Port Wine Route, located in a cluster of 6 pairs and tied to 83%. Other organisations that are embedded in highly clustered neighbourhoods are the University of Trás-os-Montes e Alto Douro (66,7% of all possible ties are present), the Municipalities (all with 66,7%), NERVIR and AETUR (each with 50%). It is worth referring that the organisations that usually stand out for their centrality and connectivity, present low individual CC: for example, CIMDOURO is in a low clustered group, as only 10,1% of all possible ties are present. The same occurs with CCDR-N (9,5%) and Douro Tourism Board (7,05%). However, they are located in very large neighbourhoods, as CIMDOURO is among 276 possible pairs, CCDR-N is among 820 and Douro Tourism Board, 666.

Aveiro presents a different clustering pattern. The knowledge producers (Universities of Bournemouth, Oxford Brooks, Sienna, São Paulo, Brasília and Algarve and TEFI and ATLAS organisations) as well as the Municipalities are connected to all possible neighbours, presenting a CC of 100% (with the exception of Aveiro Municipality). Also highly clustered are AHRESP (83,3%), National Tourism Institute (*Turismo de Portugal*) (66,7%), Aveiro Municipality (53%) and CCDR-C (47,6%). It should be referred that, despite these high CC values, the possible number of pairs are reduced.

On the other hand, there are several organisations that are less clustered, but are in the middle of larger neighbourhoods: the University of Aveiro has a CC of 12%, in a group composed by 253 possible pairs. In the same situation are CIRA (15,8% of 190 possible pairs), Bairrada Wine Route (20,5% out of 171), IDTOUR (17,6% of 136) and EFTA (14,1% out of 120 possible ties). So, these actors are in large neighbourhoods, but are poorly clustered.

7.2.2.6 External – Internal Index

The External-Internal Index (E-I Index) was developed by Krackhardt and Stern (1988). It intends to measure the group embedding based on the comparison of the number and average strength of external ties to internal ties within different groups in a network. E-I index can range between -1 and 1. A -1 value indicates that all ties are established between actors from the same group and +1 reveals that all ties are external to the group. A high E-I value will indicate more and closer ties between groups than within the group of membership.

For the purpose of this work, two dimensions were analysed concerning the composition of the groups and their embedding. The first dimension concerns the E-I Index regarding groups of different organisations (E-I $Index_{org}$), i.e. the embedding in a specific group of organisations. In this context, five groups were established comprising actors classified according to:

1) Knowledge/ Education Organisations
2) Government/ Public Organisations
3) Consultants
4) Business Associations
5) Innovation Agencies/ Innovation Support Agencies

The second level aimed at analysing the ratio of external and internal ties concerning geographical location (or geographical embedding), for which organisations were classified according to the following four categories:

1) Local
2) Regional
3) National
4) International

A partition was used in UCINET to divide the cases into the different sub-groups. This is done by creating a separate attribute file with the same row labels and the codes for each node, which is then overlapped with the overall matrix in order to obtain the intra and extra group measures.

As previously mentioned, the same measures for a random network of the same size were computed, in order obtain values of reference for both dimensions under analysis.

Table 7.4 – External-Internal Index of Douro and Aveiro networks – Organisational and Geographical Dimensions

	Douro Real Network	Douro Random Network	Aveiro Real Network	Aveiro Random Network
E-I Index$_{org}$	**-0,182**	0,328	**0,180**	0,388
Internal Ties	162	-	140	-
External Ties	112	-	174	-
E-I Index$_{geo}$	**0,212**	0,390	**0,643**	0,529
Internal Ties	108	-	56	-
External Ties	166	-	258	-

Source: own elaboration based on UCINET output

The results shown in table 7.4 demonstrate that both networks present more external than internal ties whether in organisational and geographical dimensions, once that all register a positive index. This situation is even more evident in the Aveiro's organisational network, where the geographical external links largely exceed the internal ones (258 external vs. 56 internal ties). The only exception refers to the organisational network of the Douro, where the ties established among organisations of the same group exceed the ties developed with different organisations (-0,182, corresponding to 162 internal vs. 112 external links).

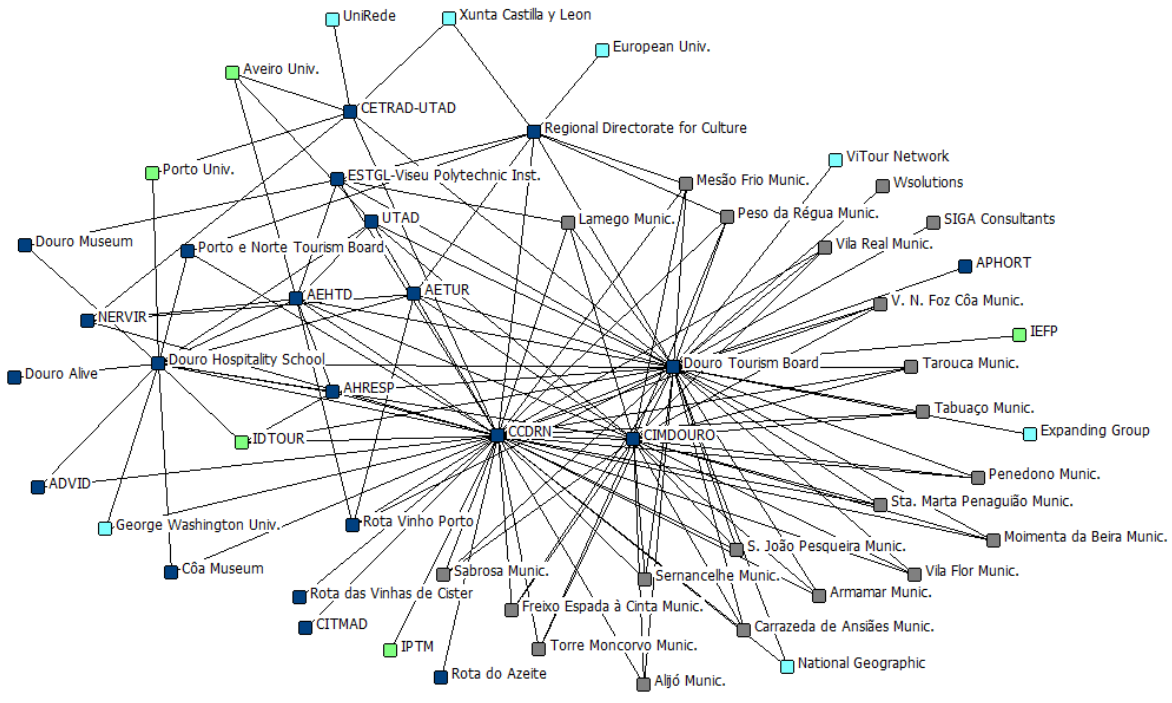
Either way, Aveiro reveals a higher index than Douro in both dimensions. This situation appears to be the most suitable for the development of innovation, considering that actors have the ability to access to different types of new and diverse knowledge from distinct sources, fostering the combination of this knowledge into new tourism products and services. However, internal ties are still present, which enables the diffusion of knowledge throughout the network (provided that it is densely connected). If we establish a comparison between the real and random network, it is concluded that Douro is below the reference values for an equivalent random network, which means that it was expected that both these networks presented more external ties than they actually do. In Aveiro, although the organisational E-I index is below the expected, the geographical dimension is above the random network, due to the fact that external geographical ties surpass the reference values.

7.2.3 Collaboration patterns by geographical scope

Considering the objectives of this research, it is useful to complement the E-I index measure with the analysis of the collaboration patterns of the network actors, clearly identifying the links among nodes from different geographical scope and among distinct types of organisations. In order to do so, the density by groups measure was computed, providing the number of ties established between the groups and the respective density.

The sociograms presented in figures 7.9 and 7.10 reflect the collaboration towards the development of innovation in tourism both in Douro and Aveiro according to the geographical scope of actors.

Figure 7.9 – Douro institutional innovation network: actors' geographical scope



Source: own construction

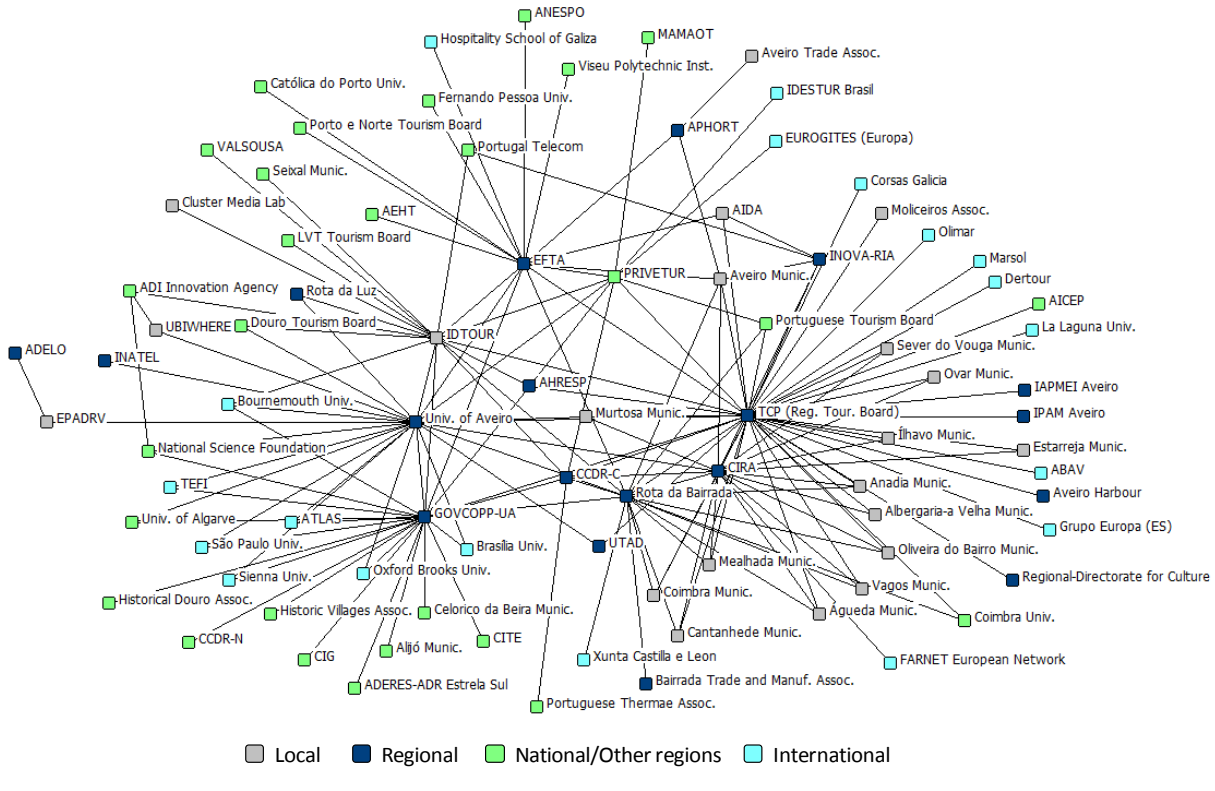
The network of Douro is comprised by 55 actors, as already mentioned. Out of these, 21 are local and 22 are regional. As they represent the majority of actors, they are also engaged in most of the

ties developed within this network. The overall pattern of cooperation is mainly characterised by the links established between regional actors (108 ties) and between the local and regional organisations (62 ties), corresponding to a density of 23,4% and 13,4%, respectively. When looking at figure 7.9, the sociogram clearly reveals the relevant contribute of Douro Tourism Board, CCDR-N and CIMDOURO to this situation. The ties with national and international organisations are residual. This unveils a high regional embeddedness of relations within tourism innovation processes.

The structure of the geographical distribution of ties in Aveiro is quite different from Douro. Regional actors are indeed the propellers of the tourism innovation dynamics. However, they are connected with organisations from all the geographic levels. The links among regional actors are the most significant (62 ties, with a density of 18,1%), followed by the ties between regional and local nodes, in a total of 56 (density of 14%). National and regional organisations present 31 links and there are 24 ties between regional and international organisations, with corresponding densities of 5,8% and 6,6%. According to figure 7.10, it is concluded that the most central actors are responsible for this values, namely the Regional Tourism Board (TCP) and CIRA (these mainly at local and regional level) and GOVCOPP research unit, the University of Aveiro and IDTOUR, with diverse connection at all levels, but standing out as the main contributors to the outwards orientation of this innovation network, as they have several national and international connections. This network also presents a significant level of regional embeddedness. However, it has the advantage of being engaged in external relationships that introduce new knowledge and foster innovation.

The relevant share of relations established between actors with a regional dimension confirms the findings of Bellandi and Caloffi (2010) who, when analysing the location of the various actors in an innovation network, concluded that a significant part of the links are among agents localised within the same geographical context.

Figure 7.10 – Aveiro institutional innovation network: actors' geographical scope

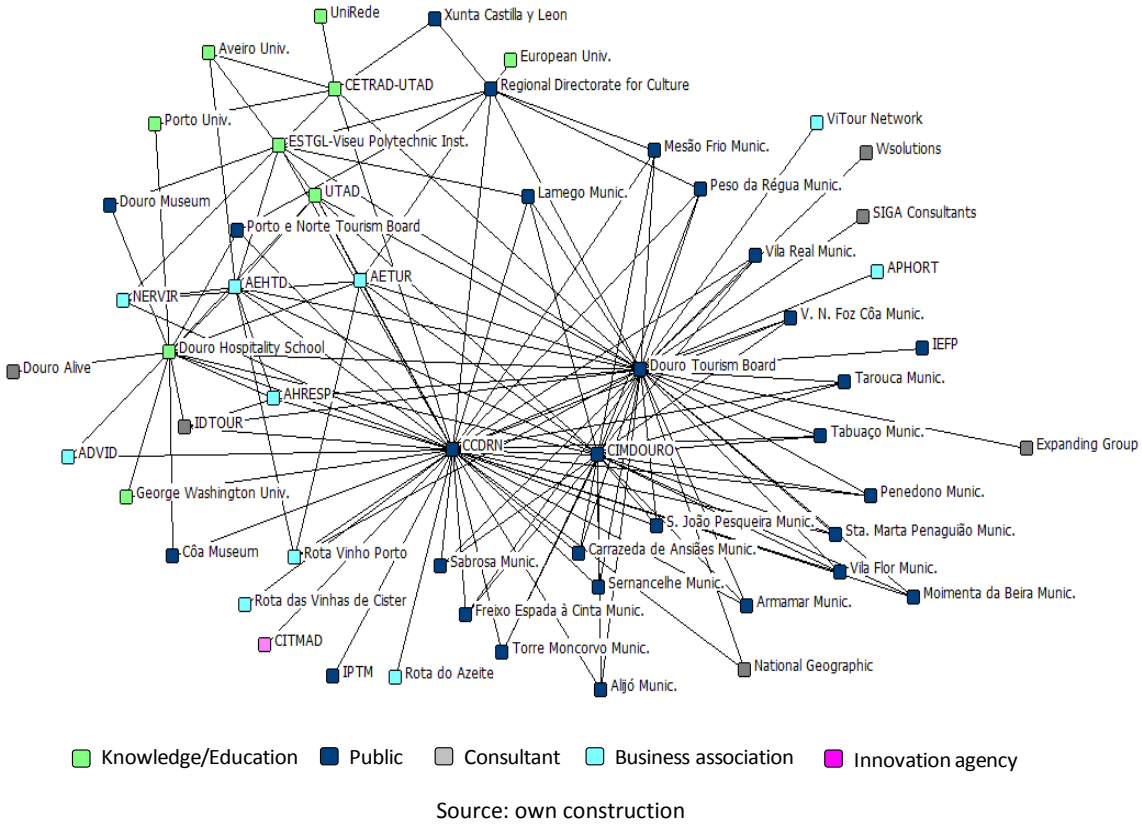


Source: own construction

7.2.4 Collaboration patterns by type of organisations

In Douro, the most relevant dynamics in terms of cooperation towards the development of tourism innovation results from the ties established among public agencies (138 ties with a density of 17%), between these and knowledge producers (19 ties, 7,3% density) and among knowledge producers (total of 14 ties and a density of 19,4%, the highest observed in this analysis). Despite presenting lower frequencies, the private organisations have an interesting performance in what concerns the densities observed, as the links established within the group have a density of 11,1% and of privates with knowledge producers is of 10%. Again, CCDR-N, Douro Tourism Board and TCP stand out within the public agencies and the Douro Hospitality School, the CETRAD research unit, the University of Trás-os-Montes e Alto Douro and ESTGL Polytechnic Institute develop important links with public agencies and within their own group. In what concerns private organisations, the AEHTD and AETUR tourism associations stand out (Figure 7.11).

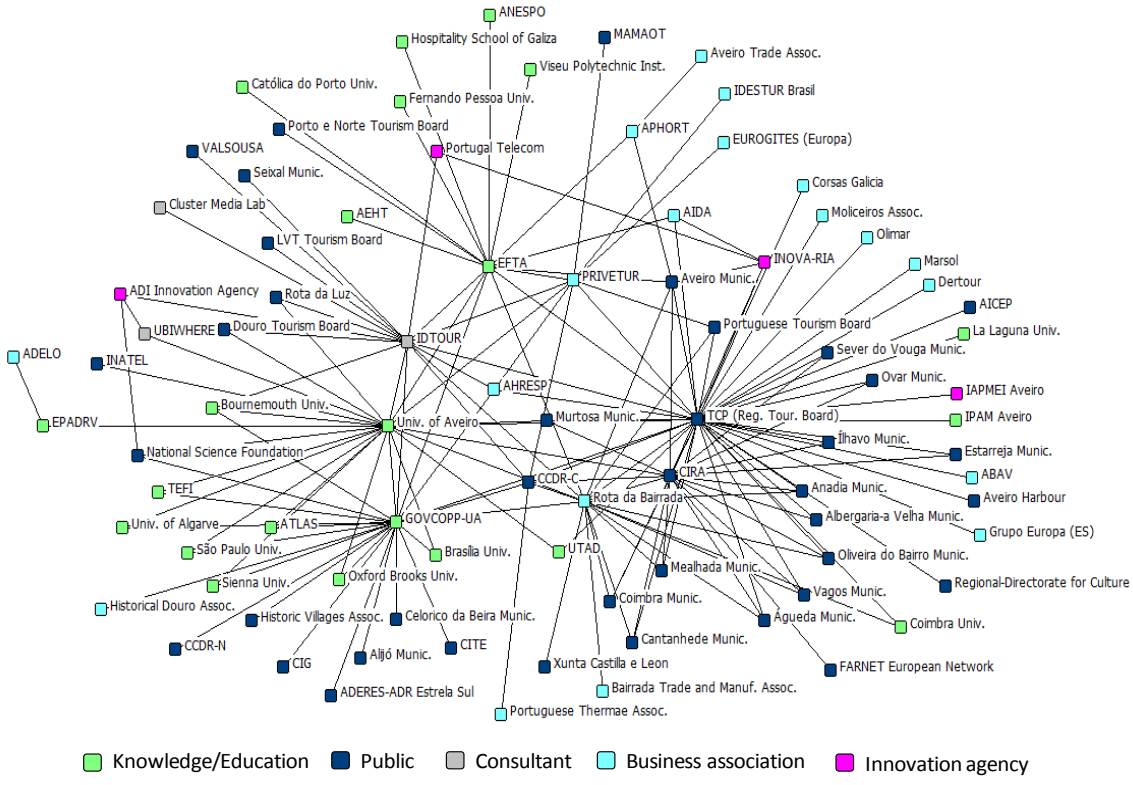
Figure 7.11 – Douro institutional innovation network: organisational type



Source: own construction

Once more, at this level of analysis, the tourism innovation network of Aveiro presents a higher diversity of links among the different groups of organisations. Nevertheless, the links between public agencies stand out with a value of 72, although the density of 4,9% is far from being the highest in the network. It is also worth mentioning the 64 ties established among the knowledge and education institutions (density of 11,7%), contributing to the dissemination of scientific knowledge on tourism which is one of the main sources of innovation. The University of Aveiro and the GOVCOPP research unit play a paramount role in linking these institutions. The 24 links between knowledge institutions and public agencies are also relevant, although the density is low (2,8%), which means that they can be significantly improved. It is also worth referring that public agencies and private organisations are engaged in collaboration through 28 links. In what relates to densities, the connection between consultants represent 33,3% of the total possible, and between consultants and innovation support agencies reach 25%.

Figure 7.12 – Aveiro institutional innovation network: organisational type



Source: own construction

7.2.5 Structural Roles and Positions: divide to conquer?

7.2.5.1 Structural Holes

The theory of structural holes (chapter 4) relates with the study of how individuals can use social capital to obtain better competitive positions within the network and how the absence of ties between nodes can define the network structure and the opportunity to build social capital. In basic terms, the existence of structural holes provide the opportunity to access to new and wider sources of knowledge and to control its flow within the network. Individuals filling these holes (brokers) are obviously in powerful positions, despite having a high or low centrality degree.

Structural holes relate to relevant aspects of the advantages and disadvantages that result from individuals' position within the network that result from their higher or lower embeddedness in

their neighbourhoods. A set of measures developed by Burt (1992) allows understanding how and why the ways that an actor is connected affect his constraints and opportunities. The basic idea under Burt's theory is that the lack of ties among alters may benefit an ego with higher autonomy, control of the flow of information, knowledge and resources. Actors bridging structural holes have rapid access to resources, fast dissemination of information regarding opportunities and threats, benefit from cooperation and are able to identify possible exchange partners and allies (Burt, 1992; Uzzi, 1996).

A first level of analysis is concerned with the notion of redundancy. A person's ego network has redundancy when his/her contacts are connected to each other as well (Borgatti, 1997). Dyadic redundancy means that an ego's tie to its alter is "redundant". The larger the proportion of others in the neighbourhood who are tied to a given alter, the more redundant is the ego's direct tie. Actors with high dyadic redundancy are embedded in local neighbourhoods where there are few structural holes (Hanneman & Riddle, 2005).

The metrics used in this researche to analyse structural holes are:

- **Effective size** of the network: represents the number of alters that an actor has minus the average degree of alters within the ego network, not counting ties to ego. It provides the number of non-redundant contacts. According to Burt (1992), two contacts are redundant when they provide the same information benefits to the ego. Nodes that are strongly connected to each other are likely to access the same resources and thus provide redundant benefits. A network rich in non-redundant links (high effective size) is rich in structural holes.
- **Efficiency:** is the effective size divided by the number of alters in ego's network. It tells what proportion of ego's ties to its neighbourhood is "non-redundant". Efficiency tells us how much impact ego is getting for each unit invested in using ties. It varies between a maximum of one, when every contact is non-redundant, and a minimum approaching zero, indicating high redundancy and thus low efficiency. The more efficient, the higher the access to structural holes and subsequently, to new and diverse sources of knowledge (Burt, 1992) fostering innovation.
- **Constraint:** it measures the extent to which ego is invested in people who are invested in other of ego's alters. Actors who have many ties to others may actually lose freedom of action rather than gain it, depending on the relationships among the other actors. It

represents the level to which a node is dependent on others through crossing links and the absence of structural holes. If an actor's time and energy is spent in a group of already connected nodes, there is no access to structural holes. Network constraint varies according to network's size, density and hierarchy, that is, constraint is high if a node has few contacts, if the network is small and if the contacts are strongly connected (high density and/or hierarchical network) (Burt, 1992; Hanneman & Riddle, 2005).

In what concerns the effective size of both networks, Aveiro presents a higher number of non-redundant contacts (245,2) than Douro (202,1). Structural holes are the gaps between nonredundant contacts. As a result of the hole between them, the two contacts provide network benefits that are in some degree additive rather than overlapping. Thus, a network rich in nonredundant contacts is rich in structural holes (Burt, 1992).

In the innovation network of Aveiro, ten actors stand out due to their higher number of nonredundant contacts (Table 7.5). Most of them are also the organisations presenting the higher degrees. The Regional Tourism Board (TCP) has 38,3 nonredundant contacts, followed by the GOVCOPP research unit (21,9) and the University of Aveiro (20,4). These are also the most efficient actors, which means that the impact that they are getting for each unit invested in using ties is high. Efficiency is large to the extent that an actor's alters are connected to different third parties. The efficiency of TCP is of 93%, followed by GOVCOPP with 91% and the University of Aveiro with 89%. Two other actors not included in the table 7.4 demonstrate to have high efficiency as well, despite having a low number of nonredundant contacts: APHORT and FCT have an effective size of 2,3 and 77,8% of efficiency each. These ten organisations are also the less constrained actors, that is, they are endowed with a higher freedom of action within the network and lower dependence on their alters. Constraint represents the time and energy spent that leads one actor back to the same contacts and actually measures the lack of access to structural holes. It ranges from zero when the node has numerous disconnected, readily replaceable links, to one when the actor has only one effective link and hence is highly constrained. From the obtained results, it is observable that TCP, EFTA training school, GOVCOPP, IDTOUR and the University of Aveiro are the less constrained actors in the network.

Other actors presenting relevant results within the structural holes measures are CIRA, the Bairrada Wine Route, the spin off firm IDTOUR, the EFTA training school, PRIVETUR, CCDR-C and

INOVA RIA innovation support agency. It is interesting to note that the majority of the ten most relevant actors are classified as regional and are public entities.

Table 7.5 – Structural holes measures for the Aveiro tourism innovation network

Actors	Degree	Effective size	Efficiency	Constraint
Most significant actors				
Regional Tourism Board (TCP)	41	38,3	0,93	0,08
GOVCOPP-UA	24	21,9	0,91	0,10
University of Aveiro	23	20,4	0,89	0,12
CIRA	20	17	0,85	0,20
Bairrada Wine Route	19	15,3	0,80	0,16
IDTOUR	17	14,2	0,83	0,11
EFTA	16	13,9	0,87	0,09
PRIVETUR	10	7,8	0,78	0,15
CCDR-C	7	4,1	0,59	0,19
INOVA-RIA	5	3,4	0,68	0,29
Whole network	**87**	**245**	**0,79**	**0,69**

Source: own elaboration

In Douro, there are fewer actors presenting relevant structural holes measures when compared to Aveiro (Table 7.6). In what concerns to the effective size, eight organisations stand out. The first one is CCDR-N, with 37,2 nonredundant contacts. This actor's counterpart in Aveiro's network (CCDR-C) has a significantly lower value, with only 4,1 nonredundant contacts (and a degree of 7, versus CCDR-N, which has a degree of 41). These results confirm the importance of this public agency in the development of Douro as a tourism destination, especially in what relates to the support of tourism innovation based on collaboration patterns. Douro Tourism Board has an effective size of 34,5. However, it is more efficient than CCDR-N (0,93 against 0,91) and less constrained (0,10 for the Douro Tourism Board and 0,13 for CCDR-N). In the third place, with an efficiency of 0,9 and 21,7 nonredundant contacts, appears CIMDOURO (association of municipalities), followed by Douro Hospitality School (effective size of 11,9 and efficiency of 0,8).

The remaining organisations present lower values, especially when compared to the actors placed at the lower places of Aveiro's ranking. The knowledge and education organisations do not stand out as relevant in Douro, within the structural holes analysis, being the only exception the CETRAD research unit that, despite not being very effective, it is, in fact, efficient, as this value reaches 0,92 (it is important to note that an actor can be efficient without being effective, and the

opposite is also true). In Aveiro, knowledge producers are within the most relevant organisations bridging structural holes.

Another interesting conclusion relates to the fact that two private business associations, namely AEHTD and AETUR seem to perform an important role at this level. Despite their lower effective size due to the reduced number of nonredundant contacts, they present an acceptable level of efficiency (respectively, 0,64 and 0,63) and of constraint (0,20 and 0,22).

In addition to the organisations ranked as the most significant, one must highlight the role of the University of Aveiro within the Douro network due to the fact that it presents an efficiency of 0,78, which places it at the fifth position of the efficiency ranking, although it comprises a different network and plays a central role in the innovation network of Aveiro. Despite the fact that the analysis is not being made to both networks together (instead, it is a comparative analysis), it may be concluded that the University of Aveiro is at a privileged position as a broker, as it connects both networks.

Table 7.6 – Structural holes measures for the Douro tourism innovation network

Actors	Degree	Effective size	Efficiency	Constraint
Most significant actors				
CCDR-N	41	37,2	0,91	0,13
Douro Tourism Board	37	34,5	0,93	0,10
CIMDOURO	24	21,7	0,90	0,14
Douro Hospitality School	15	11,9	0,80	0,16
Regional Directorate for Culture	9	6,8	0,75	0,19
CETRAD-UTAD	7	6,4	0,92	0,16
AEHTD	10	6,4	0,64	0,20
AETUR	8	4,5	0,63	0,22
Whole network	**55**	**202**	**0,70**	**0,49**

Source: own elaboration

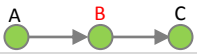
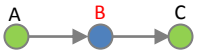
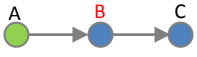
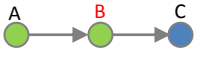
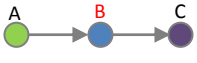
If the whole network structure is considered, the average results demonstrate that Aveiro is more efficient that Douro, with 79%, against 70%, respectively. This also occurs due to the effective size of both networks: Aveiro has a total of 245 nonredundant contacts, while Douro presents only 202. However, Douro is less constrained (0,49) than Aveiro (0,69), endowed with a higher freedom of action and less dependent on other actors (Tables 7.5 and 7.6).

When highly connected actors present a significant effective size, they will have privileged access to new and diverse knowledge and information, which may improve innovation performance at destination level. Subsequently, their efficiency will also reflect these conclusions, as they are probably the most efficient actors. It is shown that they are also the less constrained. These organisations have an important position and thus should play an important role in the network's innovation performance: they should assume the responsibility of disseminating the information, knowledge and resources that they receive throughout the network, or at least assure that it flows through the proper channels until reaching the adequate receivers. In order for that to happen, there should be a strong internal cohesion and collaboration towards the development of innovative tourism products and services.

7.2.5.2 Brokerage

Brokers are nodes that fill in gaps in a network, i.e. they connect nodes that would otherwise be disconnected. Thus, they have higher control and power over other nodes, as well as access to several types of resources, information and knowledge. According to Burt (2004, p. 349), "*people who stand near the holes in a social structure are at higher risk of having good ideas*" and therefore have a crucial role in the development of innovation at regional level.

Table 7.7 – Types of Brokers

Type of Broker	Characteristics	Graphic
Coordinator	Connects actors from the same group that he belongs to.	
Consultant	Connects members of the same group, but he does not belong to that group.	
Gatekeeper	Member of a group who is at its boundary and controls access of outsiders to the group.	
Representative	Controls access of his group to outside actors. He is the contact point of his group with outsiders.	
Liaison	Mediates the relation between two groups and does not belong to either of them.	

Source: own elaboration based on Hanneman and Riddle (2005)

Note: B is the broker

Individuals that act as brokers may play different roles, or different brokerage types. Depending on where the actor lies on the path between two other actors and the type of relations with its neighbourhood, there are five possible combinations that resulting in different types of brokers (Table 7.7).

In order to analyse this, actors should first be classified into different groups. This is accomplished by creating a partition file in UCINET in which each actor is identified as a member of a different group. For the purpose of this work, and according to the method applied to the External-Internal Index, two dimensions were analysed: the brokerage among actors from different geographical levels; and the brokerage among actors from different organisation types. Therefore, for the geographical brokerage analysis, actors were classified as local (coded 1); regional (coded 2); national/other Portuguese regions (coded 3); and international (coded 4). In what concerns organisational types, five groups were created: knowledge/education organisations (coded 1); government/public agencies (coded 2); consultants (coded 3); business associations (coded 4); and innovation support agencies (coded 5).

» Analysis of brokerage by geographical scope

UCINET outputs allows analysing the brokerage roles under three perspectives: within the membership group, within the overall network and the group-to-group brokering for each node.

In the Douro network, local actors do not perform significant roles as brokers. The local group is mostly composed of Municipalities, which act exclusively as consultants, that is, they connect members of the same group, but do not belong to that group. This means that they connect actors from regional, national or international geographical levels. It is an advantageous position, as they can access new knowledge and resources from different locations, which may increase innovation levels. However, the number of connections is very low for all actors, as each one only serves as broker 2 times, with the exception of Peso da Régua, Lamego and Moimenta da Beira that register 4 times as brokers. It is worth noting that the first two mentioned municipalities have a significant importance as tourism destinations in Douro, when compared with the overall region.

The most relevant dynamics in terms of brokerage occurs within the regional group. CCDR-N plays the five different types of brokerage for a total of 1484 times, especially as gatekeeper (368), representative (368) and consultant (346). This public agency has the ability to connect members from other geographical levels, controls the access of "foreigner" actors to regional actors and acts as the contact point of regional actors to local, national and international actors. This organisation is, thus, at an extremely powerful and in control position within the Douro tourism innovation network. The Douro Regional Tourism Board presents a very similar position by performing all five types of brokerage in a total of 1238 times. Although, the consultant role is the one that stands out (428 times), followed by the gatekeeper (260) and representative (260). It is also worth referring, at regional level, the CIMDOURO (association of municipalities) which acts as broker 496 times, highlighting the role as consultant (342). Other than these, organisations such as the Regional Directorate for Culture, AEHTD, CETRAD, AETUR, Viseu Polytechnic Institute and UTAD are also relevant brokers within the regional group. It is worth to note that Porto and North Portugal Regional Tourism Board has a very fragile position as broker, as it only appears two times, as coordinator, linking only regional actors with each other.

When analysing the national group, only two actors appear as brokers. The University of Aveiro acts as consultant four times and the University of Porto, twice. The international level is in clear disadvantage, as there is only a single broker: Xunta de Castilla y Leon serves twice as a consultant.

Table 7.8 –Brokerage roles (geographical level) in the tourism innovation network of Douro

Actors	Coordinator	Gatekeeper	Representative	Consultant	Liaison	Total
LOCAL SCOPE						
Lamego Munic.	0	0	0	**4**	0	4
Mesão Frio Munic.	0	0	0	**4**	0	4
Peso da Régua Munic.	0	0	0	**4**	0	4
Alijó Munic.	0	0	0	**2**	0	2
Armamar Munic.	0	0	0	**2**	0	2
Carrazeda de Ansiães Munic.	0	0	0	**2**	0	2
Freixo Espada à Cinta Munic.	0	0	0	**2**	0	2
Moimenta da Beira Munic.	0	0	0	**2**	0	2
Penedono Munic.	0	0	0	**2**	0	2
Sabrosa Munic.	0	0	0	**2**	0	2
Sta. Marta Penaguião Munic.	0	0	0	**2**	0	2
S. João Pesqueira Munic.	0	0	0	**2**	0	2

Actors	Coordinator	Gatekeeper	Representative	Consultant	Liaison	Total
Sernancelhe Munic.	0	0	0	**2**	0	2
Tabuaço Munic.	0	0	0	**2**	0	2
Tarouca Munic.	0	0	0	**2**	0	2
Torre Moncorvo Munic.	0	0	0	**2**	0	2
Vila Flor Munic.	0	0	0	**2**	0	2
V. N. Foz Côa Munic.	0	0	0	**2**	0	2
Vila Real Munic.	0	0	0	**2**	0	2
REGIONAL SCOPE						
CCDR-N	**242**	**368**	**368**	**346**	**160**	1484
Douro Tourism Board	**68**	**260**	**260**	**428**	**222**	1238
CIMDOURO	**2**	**76**	**76**	**342**	0	496
Douro Hosp. School	**94**	**32**	**32**	**2**	**4**	164
AEHTD	**38**	**8**	**8**	0	0	54
Reg. Direct. for Culture	**8**	**16**	**16**	**4**	**8**	52
CETRAD-UTAD	**2**	**12**	**12**	**4**	**8**	38
AETUR	**28**	0	0	0	0	28
ESTGL	**10**	**3**	**3**	0	0	16
UTAD	**4**	**5**	**5**	0	0	14
NERVIR	6	0	0	0	0	6
AHRESP	0	**1**	**1**	0	0	2
Porto Wine Route	**2**	0	0	0	0	2
Porto e Norte Tourism Board	**2**	0	0	0	0	2
Douro Museum	**2**	0	0	0	0	2
NATIONAL SCOPE						
University of Aveiro	0	0	0	**4**	0	4
University of Porto	0	0	0	**2**	0	2
INTERNATIONAL SCOPE						
Xunta Castilla y Leon	0	0	0	**2**	0	2

Source: own elaboration based on UCINET output

Note: Non-brokers were removed from the analysis

Considering the actors that play the most relevant roles as brokers, it is interesting to understand at which geographical levels their action is more significant. Douro Tourism Board is especially important for the connection among local actors, between local and regional actors and between local and regional actors with international ones. CCRDN presents a very similar pattern, though it has a higher intervention in connecting regional actors among themselves. CIMDOURO acts mostly at local and regional levels, and Douro-Lamego Hospitality and Tourism Training School stands out for acting as a broker among regional actors, and of these with national and international ones.

Out of the total of 55 nodes that comprise the tourism innovation network of Douro, 37 (67,3%) are brokers. The brokerage type that is more played in Douro is the consultant (1178 times). It is also interesting to analyse this from a geographical perspective. There is a total of 21 local actors; out of these, 19 act as brokers in a total of 44 times. Out of the 22 regional organisations, there are 15 brokers, which act as brokers 3598 times, being the most active group. The nodes classified as national and international have a minor role when analysing the results. Only 2 of the 5 national organisations are brokers, in a total of 6 times, and only 1 of the 7 international actors play this role, for 2 times. However, it is important to consider that, despite the lowest levels registered, national and international nodes may introduce novelty and fresh knowledge in the network which, when considering the internal cohesion and density, will rapidly and efficiently spread throughout the entire social structure and promote tourism innovation processes developed in cooperation.

The local actors of the Aveiro network are mostly composed by municipalities, which have a minor importance as brokers within the social structure. The majority of municipalities present a value of zero in every type of brokerage, with the exception of Aveiro that acts 14 times as consultant connecting members of the same group, other than the one it belongs to. However, the local group instates a very important broker. IDTOUR spin-off firm stands out as one of the most significant brokers, not only for the total number of times it performs this role (224), but also because the firm acts as a liaison (122 times), mediating the relations between two groups and not belonging to either one of them, as a consultant (66 times), as a representative and as gatekeeper (16 times for each). This performance places the firm as the 6th most important broker in the network.

The group composed by regional organisations is more dynamic and integrates the most important brokers. The Regional Tourism Board is the primary broker, as it plays the five different types of brokerage in a total of 1530 times, mainly as a liaison (428 times). Despite presenting a high value as coordinator (linking regional members), it is where the value is lower (128 times). The GOVCOPP research unit and the University of Aveiro stand at second and third places acting, respectively, 502 times and 446 times as brokers. They are brokers at all five levels, being the liaison role the most relevant for both. It is, however, worth to observe that being both knowledge producers, the research unit assumes a higher importance as consultant (connects actors from the same group that he belongs to), with a value of 132, and the university as

gatekeeper (controlling the access of actors from other geographical location to regional actors) and as representative (mediates the relation of regional actors with outsider elements), with 102 times for each role. Despite creating new knowledge, it is also a vehicle for the access of local and regional actors to knowledge from outside the system.

Table 7.9 – Brokerage roles (geographical level) in the tourism innovation network of Aveiro

Actors	Coordinator	Gatekeeper	Representative	Consultant	Liaison	Total
LOCAL SCOPE						
IDTOUR	0	**16**	**16**	**66**	**126**	224
Aveiro Munic.	0	0	0	**14**	0	14
EPADRV	0	0	0	**2**	0	2
UBIWHERE	0	0	0	0	**2**	2
REGIONAL SCOPE						
Regional Tourism Board (TCP)	**128**	**325**	**325**	**324**	**428**	1530
GOVCOPP-UA	**12**	**93**	**93**	**132**	**172**	502
University of Aveiro	**38**	**102**	**102**	**66**	**138**	446
CIRA	**8**	**51**	**51**	**182**	**28**	320
Bairrada Wine Route	**20**	**60**	**60**	**74**	**58**	272
EFTA	**8**	**45**	**45**	**48**	**60**	206
CCDR-C	**2**	**8**	**8**	**2**	**2**	22
INOVA-RIA	0	**3**	**3**	**2**	**4**	12
APHORT	0	**1**	**1**	**2**	0	4
AHRESP	0	**1**	**1**	0	0	2
AIDA	0	0	0	**2**	0	2
NATIONAL SCOPE						
PRIVETUR	**2**	**15**	**15**	**12**	**24**	68
ADI Innovation Agency	0	**2**	**2**	**2**	0	6
National Science Found.	0	**2**	**2**	0	0	4
Portugal Telecom	0	0	0	0	**2**	2
Portuguese Tourism Board	0	**1**	**1**	0	0	2

Source: own elaboration based on UCINET output

Note: Non-brokers were removed from the analysis

When analysing the brokerage roles of actors at national level or from other Portuguese regions, one may conclude that the vast majority is irrelevant. The only one that stands out is PRIVETUR,

with a total of 68 times, of which the liaison role is the most significant, meaning that this organisation essentially mediates the relation between two groups different that this one. With minor importance, three national public organisations present lower values: ADI Innovation agency (6 times), the National Science Foundation (4 times) and the Portuguese Tourism Board (4 times), concentrating their efforts as gatekeepers and representatives. Finally, international actors do not perform any role as brokers.

Despite the fact that the innovation network of Aveiro includes less brokers than the one of Douro, it has more actors with a higher number of times playing this role, that is, in Douro one may highlight three or four actors as the most relevant brokers, while in Aveiro there at least seven nodes with high importance in linking otherwise disconnected actors. In terms of their action in linking actors from different geographical locations, the Regional Tourism Board (TCP) is especially relevant in establishing relationships among local organisations and between local and regional, and local and international ones. It may be considered, thus, as the main gateway for providing new links for local tourism organisations. The GOVCOPP research unit mainly brokers the relations among national actors (90) and between national and international tourism organisations (70). On the other hand, the University of Aveiro mediates important links of regional to international actors and, more relevant, it acts by linking international nodes among themselves, which places it as a very important element of access to new international knowledge and resources. CIRA and the Bairrada wine route, by their nature of association of local municipalities and firms, act as brokers of the relations among these actors. The IDTOUR spin off firm performs its brokerage role by connecting regional with national actors and national among themselves. EFTA training school follows the same pattern.

The proportion of brokers in the tourism innovation network of Aveiro is lower than Douro's, as only 23% of its actors perform this role (20 nodes out of 87).

» Analysis of brokerage by organisational type

As previously mentioned, the organisations comprising the innovation networks were segmented in five different types: (i) knowledge and education infrastructure; (ii) public agencies; (iii) consultants; (iv) private organisations; and (v) innovation support agencies, in order to allow the analysis of brokerage among these groups.

The results observed in the Douro network are presented in table 7.10. Within the group composed by knowledge and education organisations, the most important broker is Douro Hospitality School, as it performs all types of brokerage roles. However, it stands out as liaison, taking this role 164 times, connecting nodes belonging to different groups. The CETRAD research unit appears in the second place, also performing all the roles, but only for 38 times. Gatekeeper and representative are the main roles (12 times each), which means that it is the recipient of knowledge from the other groups into this one, and simultaneously it controls the access of the knowledge and education organisations to outsiders. Both these organisations are at privileged positions to control the flow of information, knowledge and resources that enter and exit the group. The University (UTAD) is also at the same position, even though only 4 times at each of these two roles. The Higher School of Technology and Management of Lamego concentrates its action on being a consultant (10 times) and liaison (6 times), while the University of Trás-os-Montes e Alto Douro accounts a total of 16 times as broker in all types with the exception of liaison. The University of Aveiro is coordinator, gatekeeper and representative, which means that, besides being the connection point between different groups, it also connects elements from its own. The overall network has a total of 9 nodes that comprise this group. Out of them, 6 are brokers (66,7%).

Table 7.10 –Brokerage roles (type of organisation) in the tourism innovation network of Douro

Actors	Coordinator	Gatekeeper	Representative	Consultant	Liaison	Total
KNOWLEDGE AND EDUCATION						
Douro Hosp. School	**6**	**30**	**30**	**34**	**64**	164
CETRAD-UTAD	**6**	**12**	**12**	**4**	**4**	38
ESTGL – IPViseu	0	0	0	**10**	**6**	16
UTAD	**2**	**4**	**4**	**4**	0	14
University of Aveiro	**2**	**1**	**1**	0	0	4
University of Porto	**2**	0	0	0	0	2
PUBLIC AGENCIES						
CCDR-N	**516**	**381**	**381**	**64**	**142**	1484
Douro Tourism Board	**418**	**317**	**317**	**54**	**132**	1238
CIMDOURO	**342**	**76**	**76**	**2**	0	496
Reg. Direct. for Culture	**18**	**14**	**14**	**2**	**4**	52
Lamego Munic.	**2**	**1**	**1**	0	0	4
Mesão Frio Munic.	**4**	0	0	0	0	4
Peso da Régua Munic.	**4**	0	0	0	0	4

Actors	Coordinator	Gatekeeper	Representative	Consultant	Liaison	Total
Alijó Munic.	**2**	0	0	0	0	2
Armamar Munic.	**2**	0	0	0	0	2
Carrazeda de Ansiães Munic.	**2**	0	0	0	0	2
Freixo Espada à Cinta Munic.	**2**	0	0	0	0	2
Moimenta da Beira Munic.	**2**	0	0	0	0	2
Penedono Munic.	**2**	0	0	0	0	2
Sabrosa Munic.	**2**	0	0	0	0	2
Santa Marta de Penaguião Munic.	**2**	0	0	0	0	2
S. João Pesqueira Munic.	**2**	0	0	0	0	2
Sernancelhe Munic.	**2**	0	0	0	0	2
Tabuaço Munic.	**2**	0	0	0	0	2
Tarouca Munic.	**2**	0	0	0	0	2
Torre de Moncorvo Munic.	**2**	0	0	0	0	2
Vila Flor Munic.	**2**	0	0	0	0	2
V. N. Foz Côa Munic.	**2**	0	0	0	0	2
Vila Real Munic.	**2**	0	0	0	0	2
Porto e Norte Regional Tourism Board	0	**1**	**1**	0	0	2
Douro Museum	0	0	0	**2**	0	2
Xunta Castilla y Leon	0	**1**	**1**	0	0	2
PRIVATE ORGANISATIONS						
AEHTD	**6**	**15**	**15**	**10**	**8**	54
AETUR	**2**	**9**	**9**	**4**	**4**	28
NERVIR	**2**	**2**	**2**	0	0	6
AHRESP	0	**1**	**1**	0	0	2
Porto Wine Route	**2**	0	0	0	0	2

Source: own elaboration based on UCINET output

Note: Non-brokers were removed from the analysis

The set composed by public agencies in Douro has a total of 29 nodes, of which 26 fill in structural holes. However, only 4 present relevant positions within this context: CCDR-N acts as a broker 1484 times. Despite playing all the roles, the coordinator role the most represented (516 times), followed by the gatekeeper and representative (381 times each). The Douro Tourism Board comes in second place (1238 times) and follows the same brokerage pattern of CCDR-N. CIMDOURO is mainly a coordinator, linking nodes from the same group, which may be justified by its structure, as it aggregates all the municipalities in the region. The Regional Directorate for

Culture also acts as broker connecting public entities (18 times), but also public entities with actors from other groups and as a connection point of outsiders to public agencies.

Among the private sector organisations, two actors stand out, AEHTD and AETUR, both representing tourism firms and organisations located in Douro. The first plays the role of broker 54 times, mostly as gatekeeper, representative and consultant; and the second as gatekeeper and representative as well. It may be concluded that private organisations concentrate their efforts in controlling the access of outside members to the group and as contact points of the private organisations with outsiders. This allows them to introduce resources and knowledge in the network and control their flow within it. There are 10 private organisations in this network, of which only 5 fill in structural holes.

To sum up, the most important actors within the whole network are CCDR-N, the Douro Tourism Board, CIMDOURO and the Douro Hospitality School, in the sense that they present the higher number of times acting as brokers. However, they have different brokerage patterns, which are:

- CCDR-N fills in structural holes mainly within its own group, linking public organisations among themselves (coordinator); it also plays an important part in connecting public agencies with private organisations and with knowledge/ education institutions as well;
- The Douro Tourism Board mostly connects members of its own group (public bodies) and public agencies with private organisations (it is a coordinator, a gatekeeper and a representative);
- CIMDOURO's brokerage occurs mainly within its own group (linking public agencies) and, although with lower values, it also links public sector organisations with knowledge and education institutions;
- Douro Hospitality School performs different brokerage roles, as it establishes connections among private organisations, between public and private organisations and between public agencies and its own group (knowledge and education). Unexpectedly, it acts more on filling structural holes within other groups, than in the group that it belongs to.

Table 7.11 – Brokerage roles (type of organisation) in the tourism innovation network of Aveiro

Actors	Coordinator	Gatekeeper	Representative	Consultant	Liaison	Total
KNOWLEDGE AND EDUCATION						
GOVCOPP-UA	**72**	**132**	**132**	**94**	**72**	502
University of Aveiro	**114**	**122**	**122**	**40**	**48**	446
EFTA	**54**	**57**	**57**	**16**	**22**	206
EPADRV	0	**1**	**1**	0	0	2
PUBLIC AGENCIES						
Regional Tourism Board (TCP)	**350**	**400**	**400**	**154**	**226**	1530
CIRA	**242**	**37**	**37**	0	**4**	320
CCDR-C	0	**5**	**5**	**6**	**6**	22
Aveiro Municipality	0	**3**	**3**	**2**	**6**	14
National Science Foundation	0	0	0	0	4	4
Portuguese Tourism Board	0	0	0	**2**	0	2
CONSULTANTS						
IDTOUR	0	**16**	**16**	**48**	**144**	224
UBIWHERE	0	0	0	0	**2**	2
PRIVATE ORGANISATIONS						
Bairrada Wine Route	0	**18**	**18**	**122**	**114**	272
PRIVETUR	**6**	**19**	**19**	**8**	**16**	68
APHORT	0	2	2	0	0	4
AHRESP	0	**1**	**1**	0	0	2
AIDA	0	0	0	0	**2**	2
INNOVATION SUPPORT AGENCIES						
INOVA-RIA	0	**4**	**4**	0	**4**	12
ADI Innovation Agency	0	0	0	**2**	**4**	6
Portugal Telecom	0	**1**	**1**	0	0	2

Source: own elaboration based on UCINET output

Note: Non-brokers were removed from the analysis

The tourism innovation network of Aveiro comprises 22 actors categorised as knowledge and education institutions. Out of these, only 4 fill in structural holes. In the first position is the GOVCOPP research unit, which performs as broker a total of 502 times. Its efforts are mostly directed for connecting the knowledge producers group with elements from other groups, either as the source or the recipient of the flow of knowledge, information and resources (gatekeeper and representative, 132 times each). It also acts as consultant, linking actors from other groups with each other. It is also significant the role as coordinator and liaison. This places GOVCOPP in

an advantaged position of controlling and accessing the network's flow of knowledge and to the overall resources. The University of Aveiro comes in second place with a total of 446 times as broker. It also acts mainly as gatekeeper and representative (122 times each), but its role as coordinator gains importance, as it is played 114 times, which means that the university has a significant weight in filing structural holes among the knowledge and education institutions. Besides these roles, it also acts as consultant and liaison. The EFTA training school reaches a value of 206 times as broker, operating at all five levels that are somewhat well distributed.

In what relates to public agencies, only 15,3% of their total are brokers (6 out of 39). Out of these, one may observe that only 2 are actually relevant, namely the Regional Tourism Board (TCP) and CIRA. The former registers a value of 1530 times as a broker, reaching high scores in all five types. CIRA reaches 320 times and acts mainly as a coordinator (242 times), filling in structural holes among public agencies (similarly to CIMDOURO, its counterpart in Douro network).

The consultancy firms are represented in Aveiro's brokerage scenario, which does not occur in Douro. Moreover, one of the firms, IDTOUR, is one of the most active brokers in the network, reaching a value of 224. This spin off's efforts are mostly concentrated in the position of liaison, when all actors belong to different groups (144 times), a very important function for the cohesion of the network among different types of organisations, for sharing distinct and enriching experiences and fostering innovative practices.

The innovation network of Aveiro includes 20 private organisations, although only 5 are brokers, namely the Bairrada Wine Route, PRIVETUR, APHORT, AHRESP and AIDA. The Wine Route stands out with 272 times acting as broker, out of which 122 as consultant and 144 as liaison. Thus, its action is especially important in linking nodes from different groups. PRIVETUR presents a significantly lower value (68), and plays all five roles with a focus on gatekeeper and representative.

Finally, as far as the innovation support agencies are concerned, the only one that does not play any brokerage role is IAPMEI-Aveiro, as the other three, even though presenting low values, are brokers. INOVA-RIA, a regional innovation support organisation, sums 12 times, equally divided among gatekeeper, representative and liaison. It may be concluded that it works in cooperative innovation processes with different types of organisations. The ADI innovation agency is a

national scope organisation, but is present in filling structural holes in Aveiro's tourism innovation network as consultant and liaison.

As mentioned before, in the tourism innovation network of Douro, four actors stand out as the main brokers, while in Aveiro one may underline the role performed by seven organisations. Their pattern of filling structural holes among the defined five groups is:

- Regional Tourism Board (TCP) is the most important broker and acts mostly in linking public organisations among themselves; public with private actors; private sector organisations among them and public agencies with knowledge/education producers. This provides it with an intensive control of the flow of knowledge within network and that is shared among the different types of organisations.
- The GOVCOPP research unit is also relevant in linking knowledge producers (national and international) with public organisations and also fills structural holes among public agencies.
- The University of Aveiro appears in third place within the ranking of brokers. Its efforts are focused on connecting different knowledge and education institutions and of those with public agencies.
- The CIRA (association of municipalities) presents a pattern rather similar to its counterpart in Douro (CIMDOURO), as it is mostly a coordinator, that is, fills structural holes among public agencies.
- The Bairrada Wine Route acts as broker by connecting public entities and those with knowledge institutions.
- IDTOUR spin off firm plays a relevant role as broker, as previously observed. It is an important element in linking public agencies among themselves, but also with other types of organisations, namely with knowledge and education institutions and private organisations.
- Finally, EFTA training school connects actors within its own group (knowledge and education).

7.3 Comparison between the overall and the regionally-based actors networks

At this point, it is found useful to compare the differences between the overall networks and the networks composed exclusively by regional actors, that is, actors located inside the NUT III Douro and Baixo Vouga (Aveiro). In order to do so, the most relevant metrics were computed, excluding the organisations located at other Portuguese regions (national) and in other countries (international), as presented in table 7.12.

Table 7.12 – Main metrics of Douro and Aveiro overall and regional innovation networks

	Douro Overall Network	Douro Regional Network	Aveiro Overall Network	Aveiro Regional Network
Order (nodes)	55	44	87	39
Size (ties)	274	234	314	178
Average Degree	4,98	5,32	3,61	4,56
Network Centralisation	69,22%	75,39%	44,5%	65,01%
Density	0,092	0,124	0,042	0,120
Average Path Length	2,134	1,937	2,591	2,267
Clustering Coefficient	0,566	0,603	0,677	0,619
E-I Index$_{org}$	-0,182	-0,248	0,108	0,169
Internal Ties	162	146	140	74
External Ties	112	88	174	104
Structural Holes				
Effective size	245	166	202	119
Efficiency	0,704	0,655	0,790	0,682
Constraint	0,486	0,456	0,685	0,529

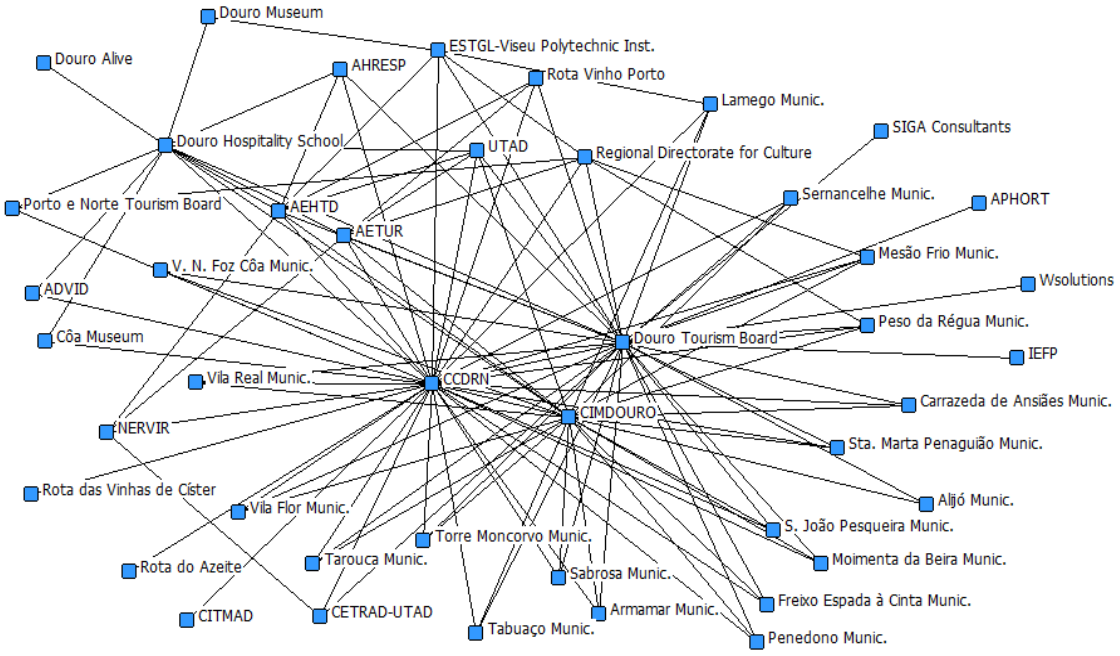
Source: own construction

The Douro regional network is composed by 44 nodes, representing 80% of the whole network actors. The vast majority of the organisations engaged in regional tourism innovation have a local or regional scope. The number of outside actors is, as already mentioned, reduced, as only 11 organisations are located outside the Douro region. Aveiro presents a different pattern. Out of its 87 actors, only 44,8% are regional (nearly half of those in Douro). More than half of the Aveiro's regional tourism innovation network actors are placed in other Portuguese regions or abroad. From these findings, one may include the following: (i) the relations within the network of Douro are very (almost exclusively) regionally embedded; (ii) Aveiro is in a more advantageous position to access to new knowledge and to new sources of innovation. These conclusions are reinforced

by the analysis of the proportion of regional ties against the overall ties: in Douro, 85,4% of total links are developed among regional actors, while Aveiro only registers 56,7% (nearly half are extended to outsiders).

The degree centrality is not very different of the registered for the whole network. The same four actors (CCDR-N, Douro Tourism Board, CIMDOURO and Douro Hospitality School) remain the most central ones and the links are not significantly reduced when applied to the regional level. In fact, CCDR-N and Douro Tourism Board only "loose" 4 ties each, Douro Hospitality School reduces 3 ties and CIMDOURO maintains the same number. Thus, the vast majority of ties developed towards tourism innovation by most central actors are characterised by its regional and local nature. Figure 7.13 clearly exhibits this situation, especially when compared to figure 7.1 which represents the whole network.

Figure 7.13 –Douro regionally based-actors innovation network

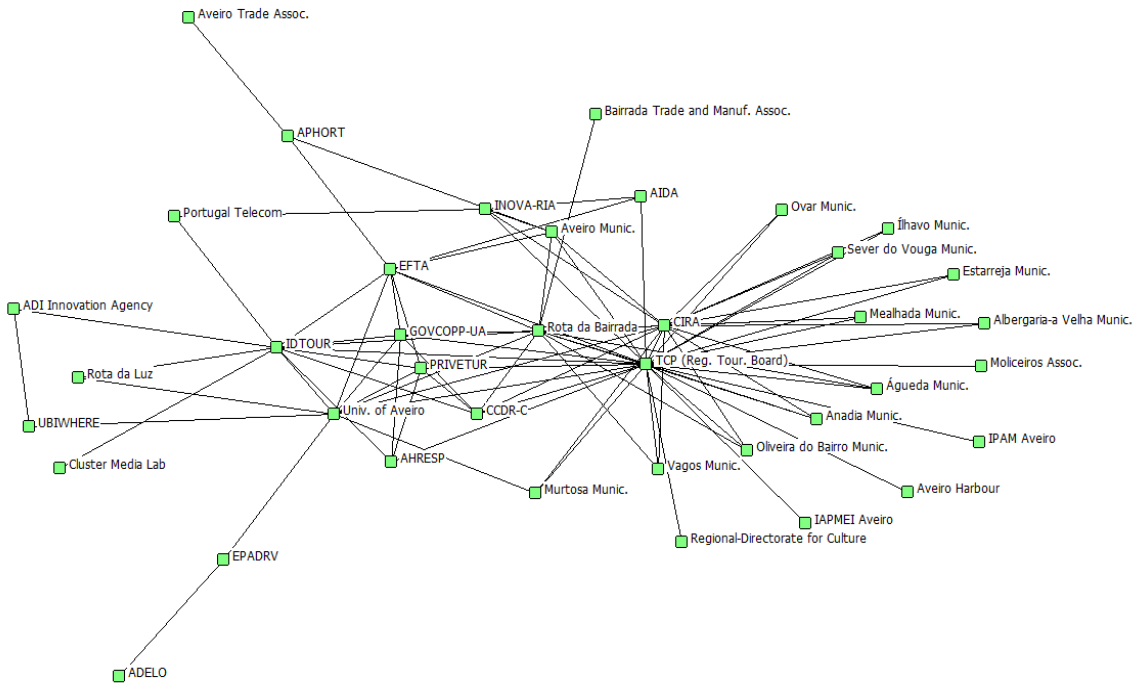


Source: own construction

In Aveiro, the higher degree of centrality is registered by the same actors, either for the whole network or at the regional network level. Nevertheless, some of these organisations lose some degree of centrality due to the fact that many of their ties are established with national or international actors. This is the case, for instance, of the GOVCOPP research unit and of the

University of Aveiro: the first registers a total of 24 ties in the whole network, a value that falls to 7 when considering only regional actors. The University loses 12 links (from 23 to 11). The Regional Tourism Board maintains itself as the most central actor. Despite it, it registers the greatest loss of ties, descending from 41 to 28. The graphic representation of this occurrence is clearer when comparing figure 7.4 with figure 7.14 (whole and regional Aveiro networks).

Figure 7.14 –Aveiro regionally based-actors innovation network



Source: own construction

The average degree is the mean number of links per actor. In both regional networks, this value rises when compared to the overall structure. If national and international actors are excluded from the analysis, the regional actors in Douro's tourism innovation network register an average of 5,3 ties and Aveiro's organisations reach 4,6 average links.

Network centralisation measures the degree of inequality of variance in the network as a percentage of that of a perfect star network of the same size. The value ranges from 1 (all actors interact with only one central actor) and 0 (all actors present equal degrees). The results obtained for the regional networks are higher than those for the overall network, especially in the case of Aveiro, which increases more than 20%. There is a much more uneven distribution of centrality

when outside actors are excluded, confirming the existence of even fewer prominent actors, more powerful than others and with more positional advantages at regional level. Douro has a centralisation of 75,4%, higher than Douro (65%), which may hold back important processes for the improvement of regional innovation performance.

As mentioned, density measures the number of direct links in relation to all possible ties. The density in Douro's regional network is higher than the whole network (0,124, or 12,4% vs. 0,092, or 9,2%). In Aveiro, the difference is even higher, as the density grows from 4,2% to 12%. The higher the density, the higher are the levels of trust among actors and the identification between the network members. Knowledge (especially the tacit type) may spread faster within the network and the coordination to engage in joint initiatives to develop collective learning and to promote tourism innovation may be fostered. However, in a similar situation where there are no "foreign" actors, the lack of access to external sources of knowledge and innovation may lead the tourism destination to a scenario of lock-in and subsequent decline.

An interesting situation comes from the clustering dynamics when national and international actors are absent of the analysis. When only regional actors are considered, the clustering coefficient of Douro increases from 56,6% to 60,3%, which means that the neighbours of this network are better connected without its external nodes. The opposite situation occurs in Aveiro, where the clustering coefficient goes down from 67,7% to 61,9%. National and international actors play an important role in the connection of Aveiro's network neighbours and that, when they are absent, there is a lower probability of these members being connected to each other. External nodes are thus critical for the Aveiro's tourism network clustering dynamics.

The External-Internal Index measures the relation between the ties established internally or externally, considering different groups of nodes. The E-I index was previously computed to analyse the links between groups of organisation from different geographical locations and distinct types. Considering that, at this point, only one geographical level is being analysed, the E-I index was only computed to compare the number of external and internal ties between different types of organisations. The value ranges from -1 (all ties within the same group – internal) and +1 (all ties with other groups – external). The Douro regional network presents a E-I $Index_{org}$ of -0,248, increasing the number of ties established within the groups that the organisations belong to. This leads to conclude that the presence of national and international actors increases the diversity of

actors with which the regional organisations are connected, expanding thus the diversity of knowledge that flow sin the network and the inclusion of more types of organisations in the joint endeavours related to tourism innovation. On the other hand, the actors comprising the regional network of Aveiro increase the ties with actors from different organisations when compared to the whole network, as the E-I $Index_{org}$ is of 0,169, higher than the registered for the whole network (0,108). Regardless, in both cases, Aveiro presents a pattern more oriented to the establishment of relations with different groups, which provides the actors with more diverse resources.

In what concerns the analysis of structural holes, the elimination of external actors reduces the networks' efficiency, meaning that the proportion of redundant contacts increases. Douro's whole network has a proportion of nonredundant contacts of 70,4%. This values lowers to 65,5% in the regional network. In Aveiro the situation is similar: the whole network is efficient at a rate of 79% (79% of all contacts are nonredundant). When considering only regional actors, nonredundant ties fall more than 10% to 68,2%.

Constraint is also affected when disregarding national and international organisations, but in a positive way for both networks, as they are less constrained, having a higher freedom of action and are less dependent on others due to the absence of structural holes.

7.4 The influential role of Small-World Networks for regional tourism innovation

Small world networks result from high clustering and low average path length, a combination that represents dense social structures. These provide a set of advantages for innovative players. The existence of redundant and dense local links allow organisations to rapidly access deep knowledge (high flow of information), to benefit from being part of a larger network as they may access to information from nodes connected to other networks (brokers) and enjoy of greater levels of trust and cooperation. In fact, small worlds combine Coleman's and Putnam's theory on social capital (high trust resulting from dense ties) and Burt's structural holes (absence of ties or static holes strategically filled in by brokers). There is a positive correlation between small world networks and regional innovation performance, as confirmed by Schilling and Phelps (2007), Uzzi and Spiro (2005) and Verspagen and Duysters (2004).

However, it is necessary to monitor if the network is too inward oriented, with many internal ties and few external connections. Excessively dense networks make knowledge redundant and homogeneous due to the existence of many paths to the same actors. Within this scenario, it is difficult to make new ideas emerge.

A social structure is a small world network when the coefficient is greater than 1. The metric developed by Watts and Strogatz (1998) and previously explained in detail (chapter 5, section 5.3.4.2) has provided the results shown on tables 7.13 and 7.14.

Table 7.13 –Small World Coefficient of the Douro network

Clustering Coefficient		Path Length		Small World Coefficient
Real	0,566	**Real**	2,134	**7,63**
Random	0,091	**Random**	2,618	
CC_{ratio}	6,22	**PL_{ratio}**	0,82	

Source: own construction

Both structures may be classified as small world networks. Douro registers a coefficient of 7,63 and Aveiro one of 20,35. This difference is explained by the fact that Aveiro's network is more clustered than Douro, and also presents a higher efficiency in terms of nonredundant contacts and structural holes. It may be concluded that the tourism innovation network of Aveiro can more easily than Douro obtain the above mentioned advantages in resulting from its "small worldness" and thus present a higher innovation performance. In fact, according to the data obtained through the firms' survey (analysed in chapter 6), the proportion of innovative firms is indeed higher in Aveiro (84,4%) than in Douro (77%). Tourism firms located in Aveiro also present greater innovation intensity (level and diversity of innovations).

Table 7.14 –Small World Coefficient of the Aveiro network

Clustering Coefficient		Path Length		Small World Coefficient
Real	0,677	**Real**	2,591	**20,35**
Random	0,045	**Random**	3,505	
CC_{ratio}	15,04	**PL_{ratio}**	0,74	

Source: own construction

7.5 Networks within innovation specific activities

The final dimension of analysis concerns the relationships established among the organisations within tourism innovation specific activities, that is, activities that foster or form the basis of innovation and innovative outputs. These are:

i. Knowledge creation;
ii. Knowledge sharing;
iii. New product development;
iv. New process development;
v. New marketing strategies.

In order to accomplish this analysis, the main metrics on centrality, connectivity and structural holes were computed for both networks of each specific activity (see tables 7.15 and 7.16). A sociogram was built for each specific network.

Table 7.15 –Metrics regarding Douro's specific innovation activities networks

	Knowledge Creation	Knowledge Sharing	New Product	New Process	New Marketing
Size (ties)	80	150	38	30	36
% whole network	29,5%	54,7%	13,9%	12,1%	13,1%
Connected nodes	27	49	16	13	13
% whole network	49%	89,1%	29,1%	23,6%	23,6%
Disconnected nodes	28	6	38	42	42
Total nodes	55	55	55	55	55
Average degree	1,45	2,73	0,69	0,55	0,65
Effective average degree	2,96	3,06	2,38	2,31	2,77
Density	0,027	0,051	0,013	0,010	0,012
Network Centralisation	20,27%	60,10%	12,12%	10,48%	16,04%
Average Path Length	2,635	2,334	2,783	2,423	2,103
Clustering Coefficient	0,484	0,592	0,341	0,250	0,491
Structural Holes					
Effective size	64	123	31	27	28
Efficiency	0,840	0,852	0,893	0,921	0,825
Constraint	0,68	0,75	0,69	0,73	0,7

Source: own construction

Table 7.16 –Metrics of Aveiro's specific innovation activities networks

	Knowledge Creation	Knowledge Sharing	New Product	New Process	New Marketing
Size (ties)	100	250	124	52	122
% whole network	31,8%	79,6%	39,5%	16,6%	38,9%
Connected nodes	42	79	43	30	42
% whole network	48,3%	90,8%	49,4%	34,5%	48,3%
Disconnected nodes	45	8	44	57	45
Total nodes	87	87	87	87	87
Average degree	1,15	2,87	1,43	0,60	1,40
Effective average degree	2,38	3,16	2,88	1,73	2,90
Density	0,013	0,033	0,017	0,007	0,016
Average Degree	1,149	2,874	1,425	0,5977	1,4023
Network Centralisation	15,12%	39,43%	28,06%	10,00%	31,66%
Average Path Length	2,662	2,659	2,699	2,083	2,614
Clustering Coefficient	0,427	0,573	0,157	0,000	0,775
Structural Holes					
Effective size	89	221	118	52	97
Efficiency	0,895	0,863	0,954	1	0,795
Constraint	0,78	0,88	0,7	0,84	0,74

Source: own construction

7.5.1 Knowledge sharing

The obtained results for Douro's tourism innovation network are presented in table 7.15. Considering the above mentioned activities, it is concluded that the **knowledge sharing** network is the most significant of the five. Out of the 55 whole network actors, 49 (89,1%) are engaged in disseminating new knowledge that further regional tourism innovation. Only six actors are not part of the knowledge sharing structure (Expanding Group, IPTM, CITMAD, Olive Oil Route, Wsolutions and Cistercian Vines Route), as illustrated in figure 7.15. The size of the network is of 150 ties (54,7% of the 274 registered for the whole network). The average degree is also significantly higher than the observed for the other specific networks, as each actor has a 2,73 average number of links (3,06 if the disconnected nodes are not considered).

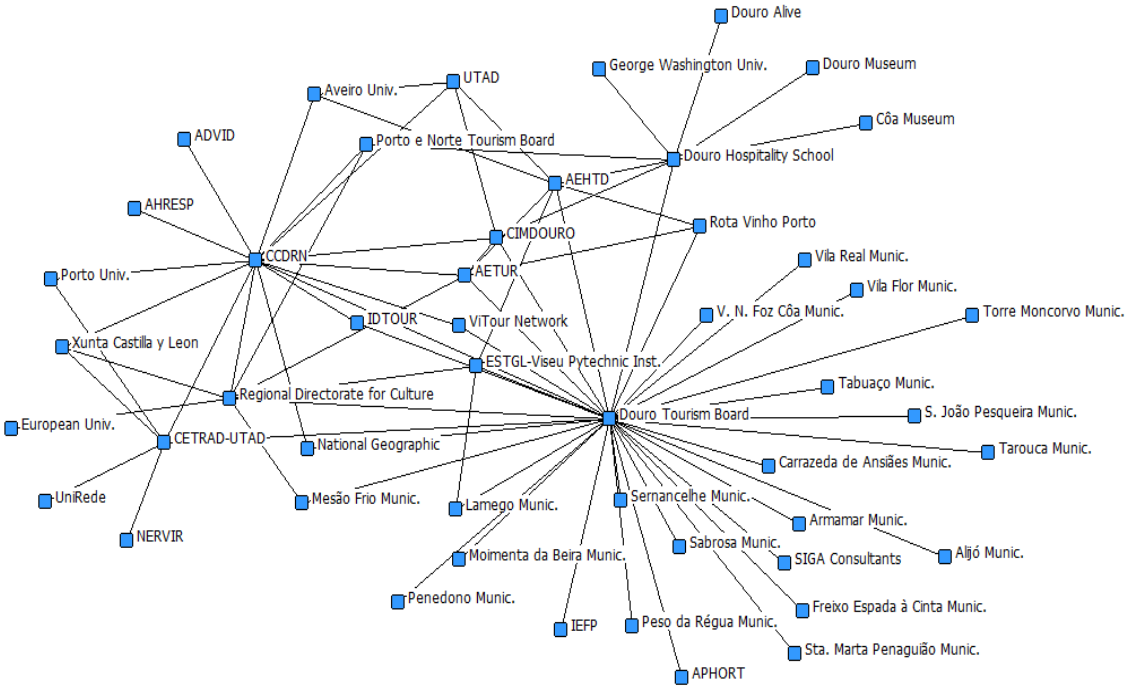
The number of direct ties in knowledge sharing in relation to all possible ties is of 5,1%, which, despite being the highest value within all specific activities, is lower than the one observed for the whole network (9,2%), similar to the remaining specific activities networks. Density is a measure

that allows drawing important conclusions on the pace through which knowledge and information spreads in the network, as well as on the levels of social capital. It was already mentioned that dense networks increase the levels of trust among the network members and promotes the identification with the group and with common goals. Thus, the development of collective dynamics that strengthen regional innovation systems is facilitated. In order that knowledge sharing, namely tacit knowledge, may easily occur and improve innovation performance, it would be advantageous that the number of direct ties could be increased. It is worth to remember that knowledge sharing is one of the main processes on the basis of the development of collective innovation within regional tourism innovation systems.

However, dense networks may also lead to the existence of many redundant ties, which is not useful for innovation as it reduces the network efficiency. It is therefore useful to combine this analysis with the structural holes metrics. The knowledge sharing network has an effective size of 123 nonredundant contacts and a correspondent efficiency of 85,2%. Dense networks usually have a high number of redundant links and of nodes that are strongly connected to each other, accessing the same knowledge. This network is rich in nonredundant contacts, which means that it is rich in structural holes. These may potentially be filled in by brokers that introduce new and fresh knowledge in the network that may subsequently be disseminated to all members. In this case, collective learning takes place, fostering joint innovation at regional level.

Network centralisation measures the extent of concentration in the network. The value, that ranges between 0 and 1 (or 100%) informs on the distribution of the power of actors. The higher the centralisation index, the more unevenly it is distributed, being thus concentrated in a few actors, usually the most central ones. In this particular case, the centralisation is of 60%, meaning that there is a reduced number of prominent actors with positional advantages. As in the whole network, two actors stand out due to their centrality: Douro Tourism Board and CCDR-N, respectively with a degree centrality of 34 and 15, and a betweenness centrality of 891 and 210. These organisations perform the most relevant roles in the knowledge sharing network. In result, the clustering coefficient, which measures the extent to which some actors present more activity with many ties around their alters, is high with a rate of 59,2% (higher than the same metric registered for the whole network). The knowledge sharing network is more clustered than the overall structure.

Figure 7.15 –Douro knowledge sharing network



Source: own construction

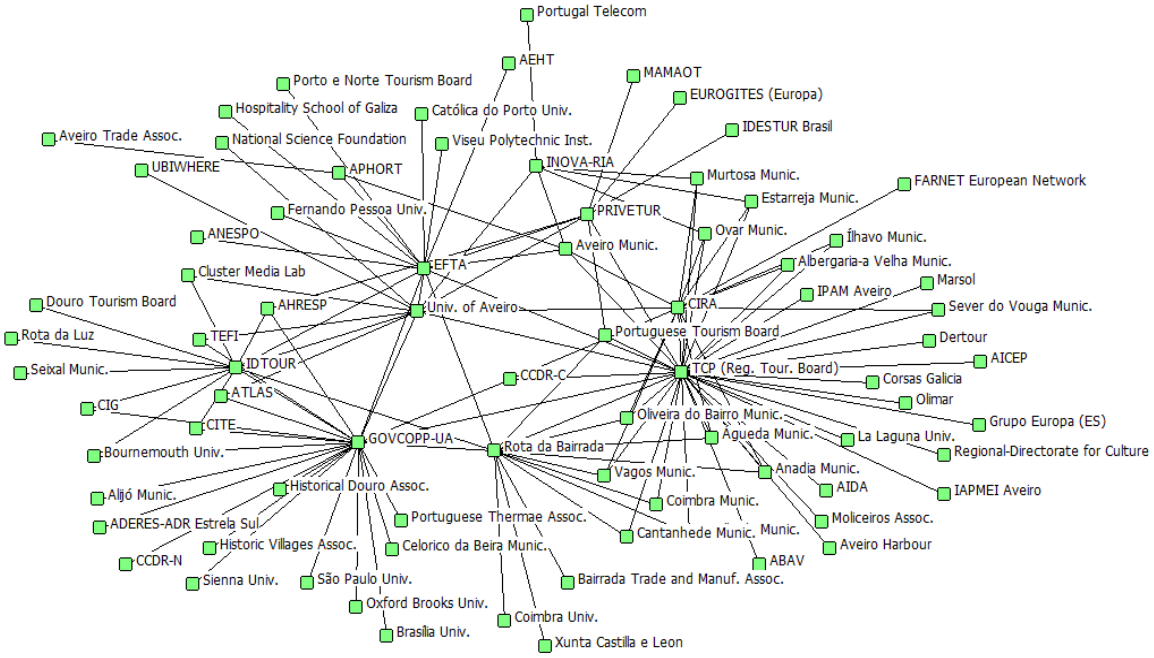
Note: Isolated members removed

In Aveiro, the knowledge sharing network is also the most significant out of the five under analysis (Table 7.16), presenting a very similar pattern to Douro's corresponding structure, although in a much higher dimension (in terms of size and order). It is composed by nearly 91% (79) of all actors and 250 ties (79,6% of those registered for the whole network). Only eight organisations are not involved in knowledge sharing within tourism innovation processes, and it is worth referring that they all are from outside the region. The actors present an average degree of 2,87, slightly higher than Douro.

The density is of 3,3%, lower than Douro and than the one observed for the whole network (4,2%). As mentioned, a low density may hamper tacit knowledge dissemination, the relationships of trust among network members, collective learning processes and, ultimately, innovation performance. This occurs due to the weight that external linkages represent in the overall structure.

The knowledge sharing network of Aveiro is centralised at 39,4%. It is the highest observed value, when compared with the remaining structures. However, it is lower than the Aveiro's whole network centralisation index and even more than the value registered by Douro. This means that centrality is better distributed and there is a higher number of central organisations. In fact, when considering individual centrality measures, seven actors stand out: the Regional Tourism Board, the GOVCOPP research centre, Bairrada Wine Route association, Aveiro's Tourism Trainig School, CIRA, the University of Aveiro and the spin off idtour. These are the most prominent organisations in knowledge sharing processes leading to regional tourism innovation.

Figure 7.16 – Aveiro knowledge sharing network



Source: own construction

Note: Isolated members removed

According to the clustering coefficient (57,3%), one may conclude that actors are close to each other and that relationships are embedded, fostering the rapid dissemination of knowledge and improving the potential for collective learning. Nonetheless, it is below the same measure of the whole network (67,7%), but very close to Douro's clustering pattern.

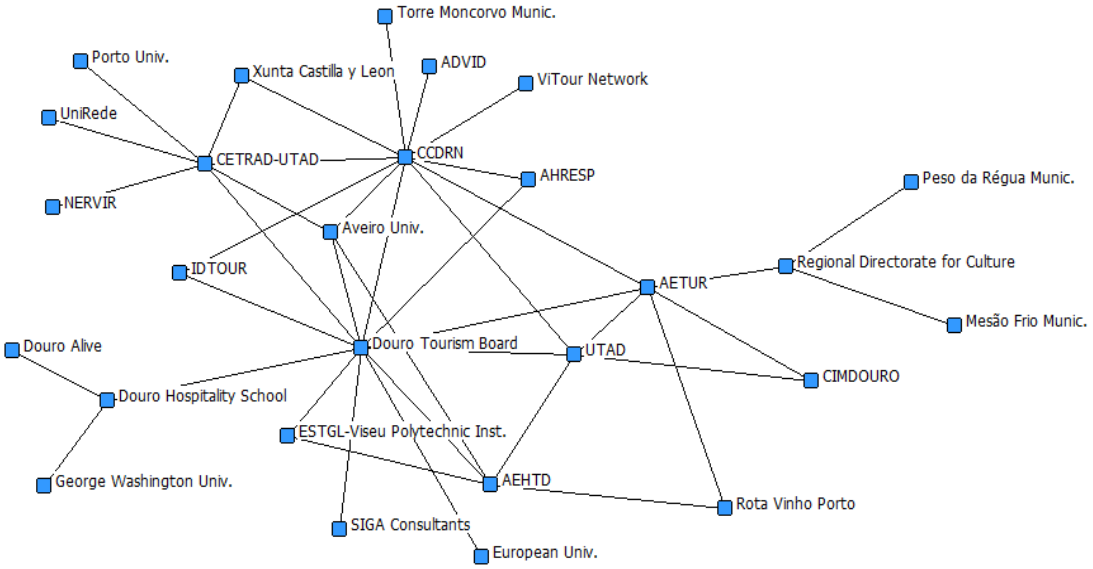
This network has a total of 221 nonredundant links and is more efficient that the whole structure, with 86,3%. It is also very constrained (with the exact same value of Douro – 88%), with reduced access to structural holes and brokerage positions, an occurrence which is not as significant for the whole network with a constraint level of 69%.

7.5.2 Knowledge creation

In the Douro region, **knowledge creation** follows knowledge sharing in terms of networked tourism innovation dynamics. This specific network is composed by 80 ties (29,5% of the whole network) and 27 nodes. Only half (49%) of the overall tourism innovation network's actors are engaged in collaborative processes of knowledge creation, presenting and average degree of 1,45 links (Figure 7.17). In what concerns the density, it is lower than the observed for knowledge sharing: only 2,7% of all possible ties are effective. This leads to the conclusion that there is less social capital, trust and social proximity, hampering the flow of resources (namely knowledge) and the necessary collective learning processes that lead to innovation. Network centralisation is of 20,3%. This lower value indicates that centrality is more equally distributed, that is, power and prominence are not so much concentrated in a single or very few actors, being shared by a higher number of organisations. In fact, when analysing the metrics of individual centrality, it is observed that, beyond Douro Tourism Board and CCDR-N (both maintaining the most central positions), other organisations emerge within networked knowledge creation, namely, the CETRAD research unit, AETUR, UTAD and AEHTD. One may conclude, thus, that the most central actors are public agencies, although closely followed by knowledge and education organisations, in this case a research unit and a university, which highlights the role played by scientific knowledge creation in regional tourism innovation. The presence of organisations representing Douro's tourism private sector (AETUR and AEHTD) is also relevant, especially if one considers that both these associations are extremely relevant in terms of the type and number of firms that they represent. Their centrality level leads to conclude that the knowledge creation process is subsequently expanded to Douro's tourism firms. Finally, it is important to acknowledge that the knowledge creation process includes public agencies, the private sector and knowledge and education organisations, combining thus a multiplicity of interests and realities within the regional tourism industry.

The clustering coefficient registers an interesting level at a rate of 48,4%, which means that actors are close to each other, the relationships established within the knowledge creation process are regionally embedded and the knowledge flows easily throughout the structure, increasing the potential for collective learning and innovation, as observed for the knowledge sharing network. Moreover, a high cluster coefficient reveals a less vulnerable and more robust structure in terms of connectivity.

Figure 7.17 – Douro knowledge creation network



Source: own construction

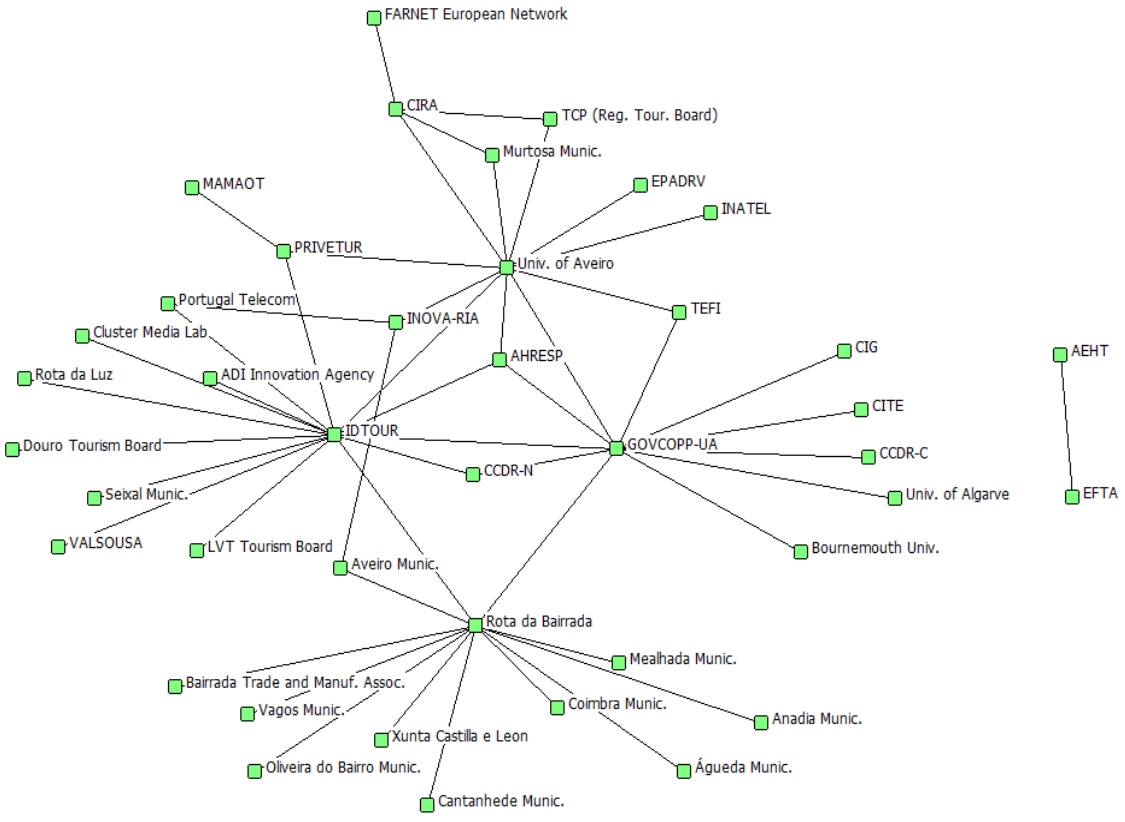
Note: Isolated members removed

In terms of structural holes, this network has an overall effective size of 64 nonredundant contacts and en efficiency of 84%, higher than the 70% registered for the whole network. A high efficiency rate means that the time and energy invested in current contacts are well spent. Efficient networks provide instant access to diverse sources of knowledge through a small number of links. Despite the fact that the value of efficiency for the knowledge creation network is the second lower (the less efficient is the new marketing strategies network), it is still considered high. In addition, this structure is the less constrained (68%) when compared to the others, although significantly higher than the aggregated constraint for the whole Douro's network (49%). As referred, network constraint allows measuring if the time and energy are being "wasted" in a single group of already connected organisations, which means that the access to structural holes

is reduced or inexistent (Burt, 1992). The more size-effective and efficient, and the less constrained a network is, the higher is the existence and access to structural holes, which increases the chances of identifying and developing new opportunities and fostering regional innovation performance.

While in Douro the knowledge creation network is the second largest, in Aveiro is the fourth (knowledge share, new product and new marketing appear first), although the proportion of the total network is similar in both structures. It has a size of 100 ties and 42 connected nodes (Figure 7.18). Less than half of the whole actors are entailed in knowledge creation, and only 32% of the ties are present. The density is low, with only 1,3% of all possible ties being established. However, this sparse network presents a high efficiency level, as 89,5% of ties to neighbours are nonredundant, increasing the opportunity of access to structural holes and diversified knowledge sources.

Figure 7.18 – Aveiro knowledge creation network



Source: own construction

Note: Isolated members removed

Out of the 42 organisations that cooperate to create new knowledge for tourism innovation, four stand out, namely the spin off idtour, the GOVCOPP research unit, the university of Aveiro and the Bairrada Wine Route. These actors register the highest degree of centrality. The network centralisation is, however, low (15%), which means that there is a balanced distribution of centrality and power, in opposition to the whole network which has a centralisation of 44,5%. The fact that the often most central actors are not in prominent positions allows that others reach a more significant position within the network. The clustering coefficient is of almost 43%, slightly lower than in Douro, but shows a favourable scenario for the strengthening and embeddedness of relations, emergence of trust among the actors and an increase in the potential for collective learning.

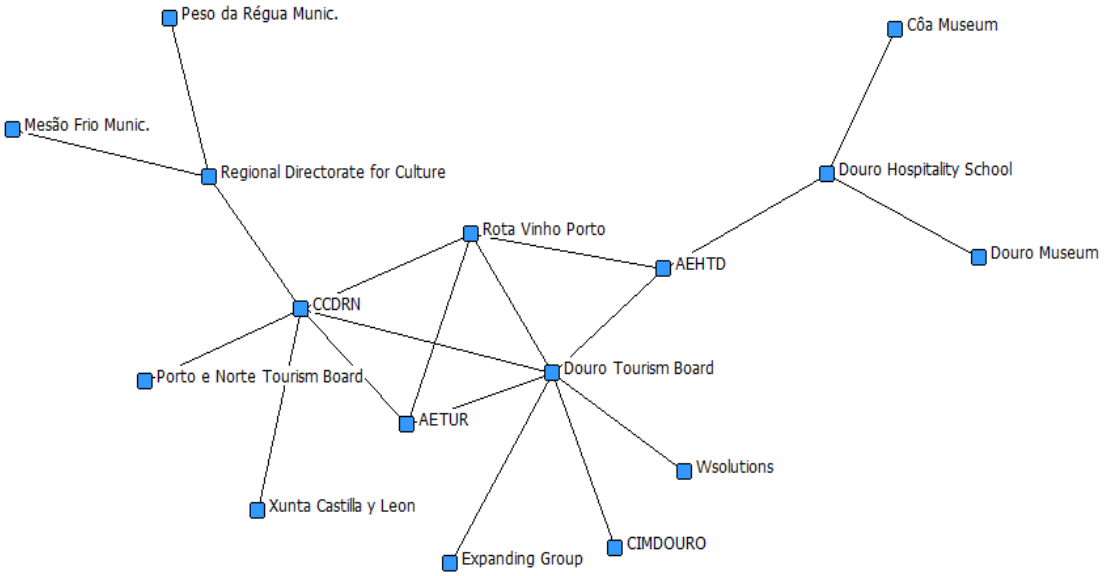
7.5.3 New product development

In the Douro region, the new tourism product development network is composed by only 16 organisations engaged in 38 ties representing, respectively, 29% and 14% of the whole network. This situation leads to the conclusion that the networked dynamics based on knowledge creation and sharing are not transposed to the creation of new tourism products. The underlying innovation processes involve a number of actors and relationships that is significantly reduced when it comes to effectively developing innovative outputs. This situation is also reflected in the low average degree (0,69 links per node) and in a low density where only 1,3% of all possible ties are present, resulting in an extremely sparse network (Figure 7.19).

As expected, network centralisation is low, of about 12%. However, the most central actors remain the Douro Tourism Board and CCDR-N, closely followed by Porto Wine Route. Besides these, it is also worth drawing attention to the Northern Regional Directorate for Culture, the Douro Hospitality School and the private tourism associations AETUR and AEHTD. This network is mainly composed by public agencies involved in tourism destination management, planning and financing, with a reduced participation of organisations that usually play important roles in designing and implementing tourism products. The exception is AETUR, AEHTD and the museums of Douro and Côa, these last two, despite comprising the structure, have a very low degree and appear to be peripheral actors. Two consultants are present (Expanding Group and Wsolutions), but also in the same conditions.

This situation is to some extent surprising, as the results of the surveys applied to Douro's tourism firms (see chapter 6) indicate that new tourism products is the most popular type of innovation introduced by these firms in the last three years. An important conclusion may be drawn: there are new tourism products being placed in the market by tourism firms located in Douro, but these innovative outputs do not result from the dynamics of networked innovation involving regional organisations and institutions.

Figure 7.19 – Douro new product development network



Source: own construction

Note: Isolated members removed

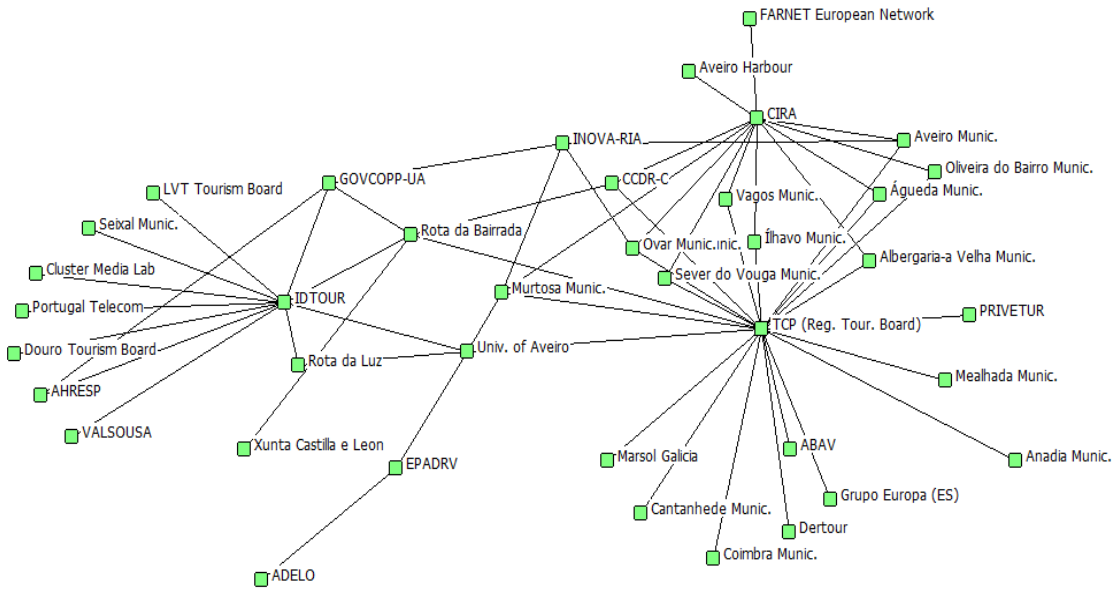
In terms of structural holes, the network has 31 nonredundant contacts, which is advantageous, considering its reduced size and order. Subsequently, its efficiency is high (89,3%) and the aggregated constraint is of 69%, again highly surpassing the whole network value of 49%, being AETUR the most constrained actor (62,9%).

After knowledge sharing, the new product development network of Aveiro is the second most significant due to its size: 49,4% of all organisations comprise this network (43 nodes), establishing 124 links among them (39,5%). It is significantly more expressive and dynamic than the Douro network for new tourism product creation (Figure 7.20). Network is centralised at 28%, nearly half of the whole structure. Within this context, the organisations with more direct ties

(higher degree centrality) are the Regional Tourism Board (25), CIRA (13), idtour (11), followed by the University of Aveiro, the Bairrada Wine Route and INOVA-RIA (each with 5). These are the most dynamic actors in terms of establishing relationships for the development of new tourism products.

Density is quite low (1,7%), which relates to the presence of many nonredundant ties, the high level of efficiency (95,4%), and the subsequent increased access to structural holes. This is, in fact, one of the highest efficiency rate observed in the entire analysis. It favours creativity, new ideas, access to resources (such as knowledge) and innovative potential. Additionally, the constraint is the lowest registered in Aveiro's specific networks (70%).

Figure 7.20 – Aveiro new product development network



Source: own construction

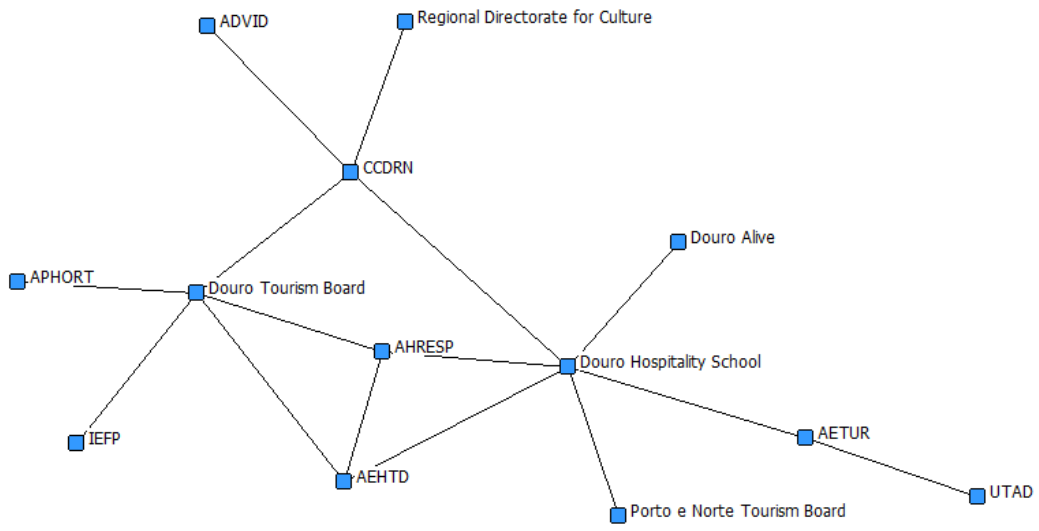
Note: Isolated members removed

7.5.4 New process development

The new process development network of Douro is the smallest of the five. It is composed by 13 organisations (23,6% of the 55 total nodes) and 30 ties (about 12% of the observed for the whole network), resulting in an average degree of 0,55 (Figure 7.21). Density is also extremely low, as only 1% of all potential connections are established. It is a sparse network. In a low density

network, there may be new information and knowledge entering the network, but there is a reduced flow. Thus, in what concerns new process development in Douro, knowledge on new tourism processes and collaborative endeavours on this matter are limited to 13 organisations. The remaining 42 disconnected nodes are not involved in the creation of innovative processes in Douro's tourism industry, as well as they do not have access to new knowledge developed within this dynamic, holding back a widespread collective learning practice associated to this specific activity. The analysis of individual centrality shows some differences when compared to the remaining four networks: Douro Hospitality Training School is the most central actor, followed by Douro Tourism Board, CCDR-N, AHRESP and AEHTD associations. New processes are defined as new or improved production processes, distribution methods or activities that support tourist goods or services, including changes in techniques, equipments and/or software. Thus, the higher centrality of Douro Hospitality Training School and AHRESP is relevant, as these organisations support the creation and development of processes that support and improve tourism firms and destinations daily operations.

Figure 7.21 – Douro new process development network



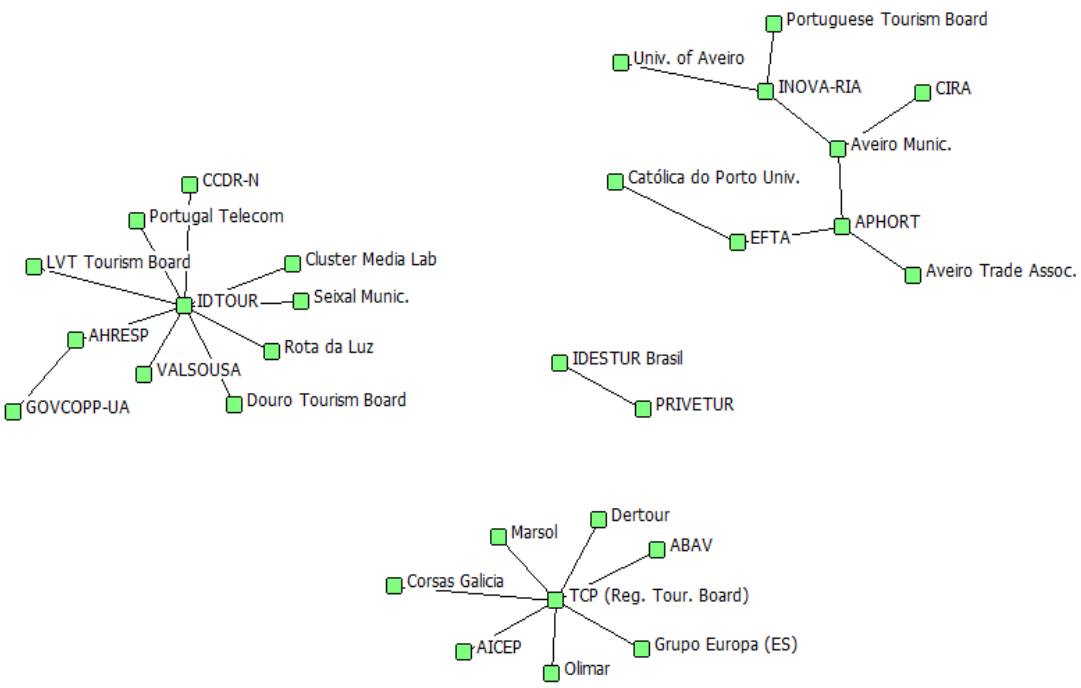
Source: own construction

Note: Isolated members removed

It is important to refer that social structures with high densities react differently to challenges and opportunities than those presenting low densities: trust, proximity, social capital and the ability to

quickly respond to environmental challenges are, in fact, limited. Moreover, this network is composed almost exclusively by regional actors, which may be a severe obstacle to the access to new knowledge and thus lead to a lock-in scenario. The high value registered for the network aggregated constraint (73%) appears to indicate such a situation, limiting the access to structural holes and brokerage positions. Simultaneously, the network is highly efficient (92%), indicating that the majority of ties is nonredundant.

Figure 7.22 – Aveiro new process development network



Source: own construction

Note: Isolated members removed

The network for new process development in Aveiro presents a very distinct pattern of the one in Douro (Figure 7.22). First, it is has more actors and ties, both in absolute values and in terms of the proportions of the whole networks. Second, while the Douro structure is entirely connected, this presents three disconnected cliques and one dyad. It is the only network that reveals this segmented pattern. A first clique is polarised by idtour, a second one by the Regional Tourism Board (TCP) and a third by the municipality of Aveiro. The dyad is comprised by PRIVETUR and IDESTUR Brasil. Idtour is the most central actor, with 9 direct ties, followed by the Regional Tourism Board (7 direct links). These are the most influential organisations in what concerns the

development of new processes for the tourism industry of Aveiro. It should however be mentioned that these cliques are different in what concerns the nature of the ties: the Regional Tourism Board (TCP) plays an administrative role and thus the links are mainly formal, while idtour does not have formal links which results in spontaneous and informal relations.

As expected due to this configuration, the network's overall density is residual (only 0,7% of all possible ties are present), as well as the centralisation (10%). The clustering coefficient is inexistent. Despite the disadvantages that a sparse network of this type may bring, important opportunities are advanced. The structural holes metrics unveil a network where all contacts are nonredundant and an efficiency rate of 100%. The access to structural holes and to all the related benefits reaches its maximum potential. If this potential is properly availed, the innovation performance regarding new tourism processes may increase significantly due to the entrance of new knowledge in the network.

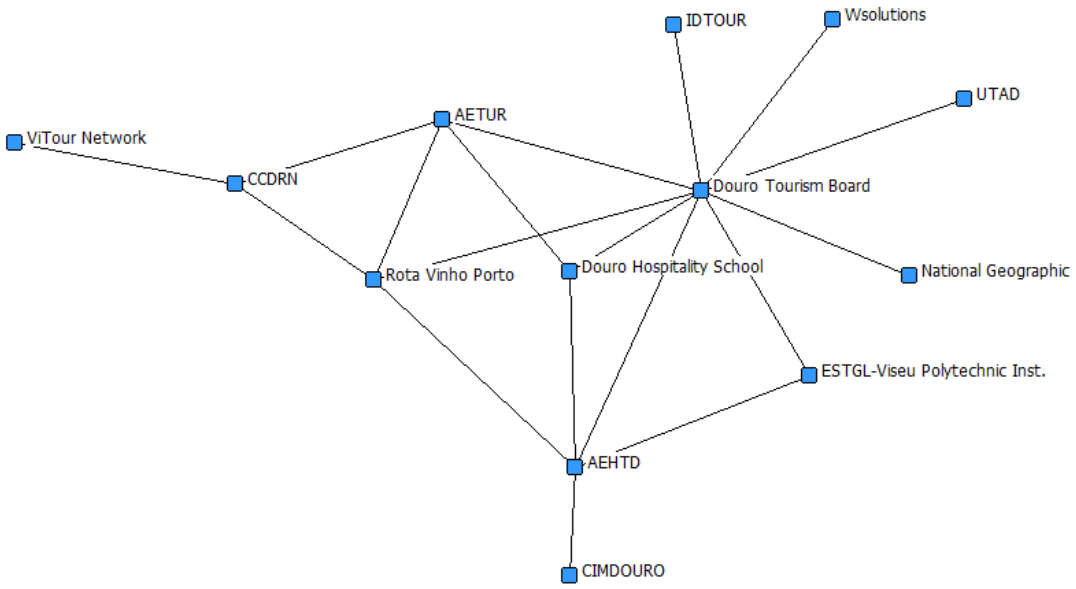
7.5.5 New marketing strategies

The network of new marketing strategies in Douro is rather similar to the new product and new process development. It comprises 13 organisations linked by 36 ties (Figure 7.23). The density is of 12% and the network centralisation is also low, registering 16%. Despite this, it has a clustering coefficient of 49%, which is in fact higher than the value observed for knowledge creation network. Therefore, although being small and sparse (density of 12%), the established relationships are more embedded, actors are closer to each other, the levels of trust are higher and knowledge flows faster, which increases the potential for collective learning and innovation. Even though the efficiency rate is the lowest of the five specific networks, it is still high (82,5%). There are 28 nonredundant contacts.

The new marketing strategies network in Aveiro has the same dimension as the one of knowledge creation in terms of nodes (42), but has a higher number of ties (122). Therefore, it is the third most dynamic specific network in this region. This network's centralisation rate is of 32%. The actors with a higher degree centrality are the Regional Tourism Board, with 28 direct links. It is an expected situation, considering that marketing and promotion is one of the main functions of this public agency. It is followed by the Bairrada Wine Route (degree centrality of 12 links), which is

explained by the nature of this association: first, it organises several joint events with many organisations and has the role of publicising them; second, the association undertook a very large new marketing strategy that involved the renewal of its image, merchandising and promotion materials, which increased the cooperation with several other actors. Another prominent node is CIRA (12 links), mainly due to the relationships with the municipalities that comprise its geographical scope of action and where it has the function of promotion in terms of tourism destination and products. Finally, idtour stands out with 10 direct ties.

Figure 7.23 – Douro new marketing strategies network

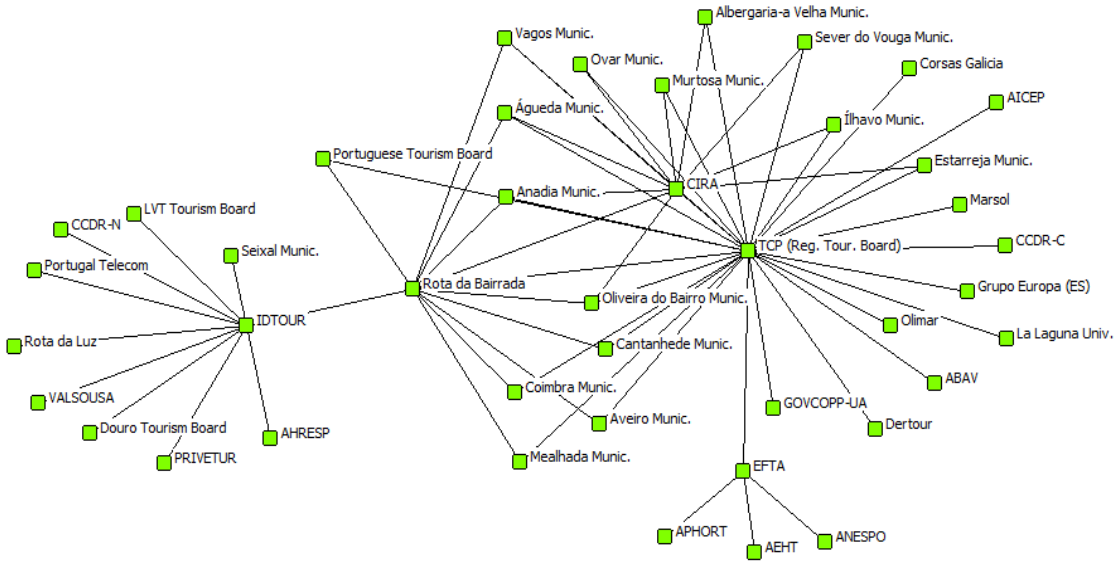


Source: own construction

Note: Isolated members removed

As shown in figure 7.24, these direct ties lead mostly to external organisations, with which the firm has worked in order to create new tourism marketing plans to be implemented at the respective destinations. The clustering coefficient is of 77,5%, the highest of the five specific networks. It may be concluded that, within the innovation activities, this is the one with more embedded and trustful relationships and where actors are closer to each other, fostering knowledge spread, collective learning and innovation.

Figure 7.24 – Aveiro new marketing strategies network



Source: own construction

Note: Isolated members removed

7.6 Conclusion

This aim of this chapter is to conduct and in-depth analysis on the networking patterns within the development of tourism innovation in the regions of Douro and Aveiro. The results provide additional complementary insights on the approach made to tourism firms in the previous chapter, by applying sociometric analysis to the relations established among tourism and innovation related institutions. Thus, besides the understanding of the performance and behaviour of tourism firms in what concerns tourism innovation, it is also provided important conclusions on the role that institutions play within regional innovation systems, especially in what concerns the support and/ or engagement in innovation processes.

Social network analysis has a diverse range of metrics that allow characterising social structures at individual actor and whole network levels. A deep study on the methods used in sociometry was made, focusing on the properties and measures that contribute to the assessment of innovation within networks (chapter 5, table 5.5). Thus, according to the objectives of this thesis, the most relevant were selected and applied to the relational data obtained from the conducted surveys.

The analysis was made according to four key dimensions, namely: (i) the overall patterns of cooperation among institutions regarding tourism innovation processes, within which important properties such as centrality, connectivity, structural holes, brokerage and the collaboration according to geographical scope of institutions and type of organisations were assessed; (ii) the comparison between the whole networks and the regionally-based networks, aiming at unveiling the embeddedness of institutional relations as well as the comparing the efficiency of both networks; (iii) the small-world characteristics; and (iv) networks of specific innovation activities. In all these dimensions, a comparative analysis was constantly made between the patterns and dynamics observed in Douro and Aveiro.

The detailed results are presented along the chapter, but some major conclusion can be drawn. The first one closely relates to one of the main objectives of this thesis, which is that different regions present different networked structures in what concerns the development of tourism innovation processes. The size of the networks is different, as well as their composition in terms of the type of actors and their geographical location. The network of Aveiro reveals a larger dimension in the number of institutions that comprise it and the number of ties established among them when compared to Douro. The region of Douro is composed mainly by local and regional institutions, representing 78% of all actors, while Aveiro presents a more balanced composition, as the rate of actors from the different geographical scope are very similar, with a relevant number of national and international actors. This indicates that Aveiro, as a tourism destination, has a higher access to diversified knowledge sources, which increases its innovative potential when this resource is used to create processes of knowledge sharing and collective learning that lead to innovation. An analogous situation occurs when considering the type of institutions: in Douro, more than half of the nodes are classified as public organisations whereas in Aveiro this value is lower, and knowledge producers and private organisations achieve a higher significance in contributing to the regional innovation environment. This is confirmed by the Internal-External Index for the type and geographical scope of actors comprising both networks.

This trend is also observed when considering the most central actors. Douro presents a structure in which only six actors gather half of all the ties present in the network, indicating that power and prominence are highly concentrated. These actors are mostly public entities. In Aveiro, eight actors stand out due to its centrality, also unveiling a high degree of concentration. However, besides the public organisations, institutions that work on R&D, knowledge production and

education occupy very favourable positions. It is worth, in this context, to highlight the role of the University of Aveiro and its tourism research centre, as well as the spin-off firm idtour.

In what concerns connectivity, both networks present structures in which all actors are linked to at least one other node. In Douro, most organisations have more than one alternative to reach other actors, which makes them less vulnerable, while in Aveiro there are many actors that possess a single tie linking them to the rest of the network. However, Aveiro discloses a higher clustering coefficient, which means that neighbours are better connected. This increases the potential for more embedded relations, higher level of trust, easiness in knowledge spread and subsequently, for collective learning and innovation.

Aveiro is also a more efficient social network as it is endowed with less redundant contacts. The investment of time and energy in creating and nurturing relations is thus well directed. This type of structure creates space for the emergence of structural holes that are occupied by brokers that inject new and fresh knowledge in the network, which reveals to be more advantageous for the development of innovation.

Finally, specific activities that lead to or are related to innovation processes are analysed. It is found that actors located in Douro mostly engage in knowledge sharing, clearly standing out when compared to the remaining activities, followed by knowledge creation. Again, the region of Aveiro is characterised by diversity, as the majority of the organisations take part in knowledge sharing, new product development, new marketing strategies and knowledge creation, by order of importance in terms of size.

To sum up, it is concluded that the network of Aveiro supports a stronger regional innovation system and presents a higher potential for the development of tourism innovation mostly in result from the diversity of the relations and the significant role of knowledge producer institutions, which endows the region with diverse knowledge and a higher propensity, ability and resources to innovate.

Chapter 8

Validation of hypothesis

8.1 Introduction

The theoretical framework developed for this thesis, based on a set of objectives and hypothesis, is presented in chapter 5 (Table 5.4). As can be observed, this framework has some complexity that derives from the fact that some of the hypothesis can only be tested with data from both empirical studies. Therefore, in order to facilitate the understanding of the process and the analysis of the variables beneath the testing of each one of the hypothesis, it was chosen to construct an independent chapter for this matter.

This chapter is therefore organised according to the main dimensions that frame the objectives and the related hypothesis. Section 8.2 includes the validation of hypothesis regarding the patterns of regional tourism innovation, related to the first objective, which is "*to characterise the patterns of tourism innovation at destination level, in terms of performance, type, activities and sources of innovation*". The following section (8.3) deals with the hypothesis concerning the structure of networks and with the both objectives defined within it, namely "*to evaluate the characteristics of the relationships established within RTIS that are on the basis of destination level innovation across regions*" and "t*o evaluate the characteristics of the structure and of the relationships established between tourism institutions within RTIS that are on the basis of destination level innovation"*. In section 8.4, the hypothesis related to the regional embeddedness of tourism innovation is addressed, followed by the analysis of the importance of knowledge for tourism innovation (section 8.5). The final section (8.6) deals with the perception of regional agents regarding the dynamics of the regional tourism innovation systems and the development of tourism destinations (section 8.7).

Following the framework presented in the methodology chapter (table 5.4), for each hypothesis, a synthesis of the variables that allow testing it is presented, and then a final remark is made, referring if the hypothesis is validated or not and why.

8.2 Patterns of regional tourism innovation

Objective 1: To characterise the patterns of tourism innovation at destination level, in terms of performance, type, activities and sources of innovation

H_1: The types of tourism innovation vary according to the region and the destinations' stage of development.

Number of innovators

Aveiro presents a rate of 84,4% of innovative tourism firms, which exceeds the value found in Douro, of 77% (Figure 6.25). The Pearson's chi-squared test revealed that, in both regions, there is a statistical significant relation between firms being innovators and the type of tourism activity they perform, namely: accommodation, restaurant, transportation, travel agency, rent-a-car, cultural services and recreational/leisure services (in Douro, p=0,013 and in Aveiro p=0,000). Nevertheless, the Contingency Coefficient shows that the degree of association is stronger in Aveiro (49%) than in Douro (35%).

Type of innovations

In what concerns the type of innovations developed (Figure 6.27), it is concluded that product, organisational and marketing innovations are more representative in Douro. This confirms some conclusions drawn out of the literature review: clusters that are in their early stages of development concentrate their efforts in developing new products and in marketing them. In Aveiro, it was found a prominence of the process innovation when compared to Douro, which is also characteristic of more developed economic agglomerations. Considering that this region has already developed its products, the focus shifts to improving processes and the level of quality that results from it. The results of the X^2 test demonstrate a statistically significant association between the region and the variable "process innovation" (p=0,037), meaning that the location of tourism firms influences the development of process innovation, but not of product, organisational or marketing.

Innovation intensity

The innovation intensity, defined as the level and diversity of innovations implemented by each firm according to the four different types, registers different patterns between both regions (Figure 6.28). Douro has a higher percentage of "low innovators" (firms that only introduced one

type of innovation) than Aveiro (respectively, 58% and 53%). The rate of firms that are highly innovative (developed the four types of innovations) is also higher in Douro (14%) than in Aveiro (7%).

Level of innovativeness of new products

Firms that introduced new products in the market are either "major innovators", when the product is new to the market, or "minor innovators", when the product is only new to the firm. It is concluded that tourism firms located in Aveiro are mostly "major innovators" (56%) while Douro presents a higher rate of "minor innovators" (56%) (Figure 6.29). This means that there is a majority of firms that innovates through the "imitation" of already existing products.

Who introduces innovation?

In both regions, local and regional firms are the main promoters of tourism innovation, followed by local and regional public agencies. However, the rates are different in Douro and in Aveiro. If one consider both types of organisations together, regional organisations are responsible for 77% of tourism innovation in Douro (Figure 6.49) and 70% in Aveiro (Figure 6.50). The embeddedness is high in both regions, but local and regional structures appear to be more relevant in Douro.

This hypothesis is supported by the statistical results and the conclusions drawn out of them, and thus is considered as validated. The type of tourism innovation presents different patterns between the regions. It is also concluded that tourism innovation differs according to the development stage of the tourism destinations.

H_2: The economic significance of innovation varies across tourism regions and their development stage.

Rate of sales resulting from innovation

In the region of Douro, 22,5% of tourism firms claim that more than 61% of their sales come from innovative endeavours. This rate is significantly higher when compared with the one observed in Aveiro, as only 7% of firms register a similar situation (Table 6.6). Considering that Douro is at an early stage of tourism development, it is understandable that a higher percentage of sales result

from new products and/or services. Once that Aveiro is in a more advanced stage, sales result mostly from already established and consolidated products.

Rate of sales resulting from innovation developed in cooperation

The majority of firms do not grant economic significance to innovation developed in cooperation, as they do not represent a significant share of sales: 34,2% of firms in Douro and 43,6% in Aveiro claim that the innovations developed in cooperation do not bring any financial benefit. However, and despite the reduced percentage, it is worth referring that 5,3% of firms from Douro claim that more than 61% result from innovations created jointly with other organisations, while in Aveiro this value drops to only 2,6% (Table 6.6).

According to the results, the hypothesis that the economic significance of innovation differs between tourism regions and destinations in distinct stages of development is validated. The region of Douro, which is at a more initial development stage, presents a higher rate of sales resulting from innovations and also of sales resulting from innovation developed in cooperation, although in a smaller scale.

H_3: Innovation activities differ across tourism regions and destinations' stage of development.

Tourism firms in Douro and Aveiro present similar patterns in terms of innovation activities (Figure 6.30). For both regions, the three most developed activities are, by order of importance: (i) the acquisition of equipment and software; (ii) the market introduction of innovations; and (iii) the training that support the development of innovation. Despite these similarities, the rate of firms engaged in each activity is rather different. For instance, in what concerns the acquisition of equipment and software, firms located in Aveiro present a rate of 73%, compared to 52% in Douro. The introduction of innovations in the market is referred by 56% of firms located in Aveiro and 52% in Douro, while providing training towards innovation activities is put into practice by 48% of Aveiro's firms and only 38% of Douro's. It is also worth mentioning that the development of internal R&D is more relevant in Douro (36%) than in Aveiro (25%), the later resorting more to external R&D.

Despite these differences, it is only found a statistical significant association between the variables "acquisition of equipment and software" and "region", which means that the location of firms (in Douro or Aveiro) does influence the engagement in this innovation activity (p=0,004; df=2; χ^2=11,180).

This hypothesis is partly validated due to the differences in the rate of firms that engage in the different innovation activities. However, in what concerns the most important ones, they are the same for both regions. There is a difference that concerns the importance granted to internal R&D (more significant in Douro) and external knowledge (more significant in Aveiro).

8.3 Networks structure

Objective 2: Networks

$2_{a)}$ To evaluate the characteristics of the relationships established within RTIS that are on the basis of destination level innovation across regions.

$2_{b)}$ To evaluate the characteristics of the structure and of the relationships established between tourism institutions within RTIS that are on the basis of destination level innovation.

H_4: The structure (components) of Regional Tourism Innovation Systems changes across tourism regions.

Share of innovations developed in cooperation

Aveiro presents a higher rate of innovations developed in cooperation than Douro (Table 6.6). About 19,3% of the tourism firms located in Aveiro developed more than 61% of their innovation in cooperation with other organisations. In the region of Douro, this rate is lower (9,5%) and different according to the type of tourism firms (p=0,043; df=5; KW=11,457).

Engagement in innovation networks

Within the innovators (firms that introduced at least one innovation in the last three years), it was found that 65,4% of tourism firms located in Douro and 63% of those located in Aveiro are engaged in networks of cooperation towards the development of innovation (Figure 6.31). These values are rather similar. The same occurs when considering all the surveyed firms (including

innovators and non-innovators), where the value is the same for both regions (about 48,5%). The application of the chi-squared test, proves that the type of tourism firm influences the engagement in innovation networks, in both Douro (p=0,002; df=5; X^2=18,816) and Aveiro (p=0,000; df=5; X^2=24,971). The contingency coefficient (C) demonstrates that this association is stronger in Aveiro (45,2%) than in Douro (38,4%).

The relation between the membership in an innovation network and if the firms are innovators or non-innovators is also statistically significant (p=0,000; df=1; X^2=46,040). It is thus, important to refer that the fact of being part of a collaborative network of innovation is positively associated with the innovative performance of tourism firms.

Type of organisations with which there has been cooperation

The organisations considered in order to analyse the structure of innovation networks may be globally classified as tourism firms and non-profit/ non-firm organisations. In the region of Douro, the links with tourism firms represent 62% of total, while with other organisations is of 38%. In Aveiro, these values are of 67% and 33%, respectively. This indicates that the patterns of cooperation inside the industry are more evident in this region.

Despite these similarities, there are significant differences when looking at specific firms and organisations with which the surveyed firms cooperate in order to innovate (Figure 6.32). The majority of surveyed firms located in Aveiro cooperate mainly with travel agencies (66%). The cooperation with these sub-sector is also significant in Douro (56,6%), although these links are not the most relevant. The higher rate of cooperation links established by Douro's firms is with cultural activities (58,5%), while in Aveiro this group is far less significant (34%). The Pearson's chi-squared test indicates a statistically significant association between the variable "region" and "links with cultural activities" (p=0,014; df=2; X^2=5,977). The opposite situation occurs with recreation activities, to which Aveiro's firms confer a higher importance (34%) than Douro's (28%). Accommodation units also stand out as important collaborators within innovation activities (47% in Aveiro, against 38% in Douro).

The major difference in cooperation patterns is verified when analysing the links with government/ public bodies: in Douro, nearly 42% of firms state to cooperate with them with the objective of developing innovation in tourism. In Aveiro, the value falls to 25,5%. This situation

may be justified by the fact that destinations at early stages of development demand stronger public involvement, which occurred effectively in Douro through the Douro Valley Tourism Development Plan created by the CCDR-N and that established the guidelines and the framework for financial support of Douro's tourism development and growth.

Effective contribution of organisations for regional tourism innovation

Some organisations are more active and dynamic in fostering and developing innovations that affect the entire tourism destination (Figure 6.41). In the region of Douro, accommodation units and cultural activities register the highest average (4,3 each, in a lickert scale from 1 to 5), followed by restaurants and recreation activities (4,2 each), passenger transportation firms (4,1) and training schools (4). Overall, tourism specific firms are considered to be more important for tourism innovation than non-firm organisations in both regions.

In Aveiro, the most significant actors are also accommodation firms (4,2), restaurants, cultural and recreation activities with a similar average of 4,1 and universities and research centres (with 4,1 and 4, respectively). It is pertinent to further analyse the main difference between the two regions, which refers to the significance that tourism firms located and Aveiro grant to knowledge producers that are among the most important agents of innovation. Considering that knowledge is critical to the innovation process, one may consider that this highly influences the dynamics of Aveiro's tourism innovation system. There is an increased proximity between the universities and research centres and regional tourism firms within innovation processes. These dynamics are marginal in Douro.

Structure of institutional networks

The institutional network of Douro comprises 55 actors and 274 ties. Its density is of 9,2%, which means that, of all possible ties, only 9,2% are effective. Each actor has an average degree of 4,98 direct connections. Aveiro's institutional network is composed by 87 actors linked by 314 ties. The density is lower than in Douro, as only 4,2% of all possible ties exist. The average degree is also lower (3,61 direct links). In what concerns network centralisation, Douro registers a rate of 69,2% and Aveiro of 44,5%. This demonstrates that there are a few prominent and powerful actors in the network of Douro (power is highly centralized) and in Aveiro the positional advantages are more equally distributed, that is, it has more prominent actors in what concerns the development of relations towards tourism innovation. Aveiro has, therefore, a larger institutional network

(more actors and links) where the power is more fairly distributed, which strengthens the potential of knowledge creation and dissemination (Table 7.1).

Regarding the composition of the networks in terms of the classification of institutions, it is concluded that Douro's network is mostly composed by public agencies (53%), 18% are private organisations and 16% fall under the category of knowledge producers. Consultants and innovation support agencies play a minor role, with respectively 11% and 2%. Again, the high preponderance of public entities relates to the initial stage of tourism development of that region (Figure 7.3). In Aveiro, public organisations represent 45% of total actors. Conversely to Douro, this group is followed by knowledge and education organisations (25%), which also play a fundamental role at the institutional level, in addition to its importance for tourism firms. Private organisations account for 20% of total nodes. Consultants and innovation support agencies represent, together, only 7% of the network (Figure 7.6).

In terms of the geographical scope, the tourism innovation network of Douro has a higher number of local and regional actors (78% in total). Only 9% of total nodes operate at national and 9% at international level (Figure 7.2). This situation unveils a low outward orientation of the innovation dynamics, indicating that it is strongly embedded. The network of Aveiro presents a different, even opposite, configuration. First, the distribution of the actors for the different groups is balanced, not presenting large differences. In second, national and international actors' together represent 55% of the network (Figure 7.5), indicating a strong outwards dynamic in terms of the processes underlying tourism innovation.

It is confirmed that the structure of regional tourism innovation systems is different across regions. The rate of innovations developed in cooperation is higher in Aveiro, and the type of organisations with which tourism firms cooperate presents a different pattern between Douro and Aveiro. It is important to highlight the most significant difference between them: in Aveiro, knowledge producers are privileged partners for innovation, while in Douro the government agencies are more relevant. In what concerns the geographical location of innovation partners, Aveiro presents a higher rate of cooperation with external organisations (national and internal) and Douro is more oriented for internal organisations (local or regional). Also, the effective contribution of different types of organisations for regional tourism innovation is distinct, namely due to the higher relevance of knowledge producers in Aveiro. The institutional networks are also different in terms of dimension (number of nodes and ties), density, average degree and network centralisation.

H_5: The types of relationships developed towards innovation within RTIS change according to the tourism region.

Geographical scope of cooperation and linkages

In Aveiro, there is a higher number of firms cooperating at local, national and international levels when compared to Douro. Conversely, Douro's firms register a significant share of firms cooperating with regional actors, of about 72% (vs. 45% in Aveiro) and only 34% of firms engage in international cooperation. In Aveiro, firms with links to international actors reach 51% (Figure 6.33).

In what concerns the total number of links established by firms, it is concluded that 57% are performed by firms located in Douro and 43%, in Aveiro. This may indicate that Douro's tourism firms may be engaged in a denser network than Aveiro. Nonetheless, it is important to recall that this situation may not be positively related to innovation performance. In fact, Douro has a lower rate of innovative firms when compared to Aveiro and a lower number of firms that develop innovation in cooperation.

When considering the overall number of internal (local and regional) and external (national and international) links, there is a different pattern between the two regions: in Douro, internal links represent 63,4% and the external are only of 36,6%. In Aveiro, the opposite is observed, as the external links reach 54% and the internal represent 46% of total (Table 6.9).

To sum up, Aveiro is more outward oriented than Douro, a situation that usually has important implications in avoiding the lock-in effect and the declining of tourism destinations, as it promotes the entering of new knowledge into the system fostering the development of innovation.

The independent sample t-test statistically confirms the differences in the number of links established at regional level between the two regions (p=0,004; df=98; t=2,944).

Frequency of contact

Within tourism activities, firms located in Douro interact more frequently with travel agencies, recreation activities, passenger transportation services and restaurants. In what regards other organisations, funding institutions, government bodies and innovation agencies stand out due to more regular contacts. Universities, training schools, business associations and consultants are at the bottom of the rank, with fewer response rates (Figure 6.36).

Tourism firms located in Aveiro present a distinct pattern, as they engage in regular contacts with travel agencies, accommodation units and restaurants. Cultural activities register fewer contacts along the year. Considering the non-firm organisations, business associations, consultants, funding institutions and innovation agencies are the ones with which tourism firms contact more frequently within innovation processes. In opposition to Douro, firms located in Aveiro do not interact frequently with government bodies (Figure 6.37).

Purpose of cooperation

In what concerns tourism firms, it is concluded that the purposes underlying cooperation are similar in both regions (Figure 6.38). However, the type of organisations selected to achieve the purposes differ between them (Figures 6.39 and 6.40). Knowledge exchange, new product development and new marketing strategies emerge as the main reasons for tourism firms searching for collaborative partners in innovation processes.

Results show that the sharing of knowledge is the most important purpose of cooperation towards innovation (indicated by 68% of firms from Aveiro and 68% from Douro). In Douro, the links established with the purpose of exchanging knowledge are especially high with cultural activities, government bodies, accommodation units and travel agencies. In Aveiro, and despite the fact that travel agencies and accommodation firms are the most representative, universities and training schools emerge as relevant partners within the diffusion of knowledge, which is, as referred in literature review, one of the fundamental pillars of innovation.

The development of new products is the second most important purpose for tourism firms to engage in cooperation for innovation. In Douro, the main agents are cultural and recreation activities and travel agencies. Aveiro's firms also search for travel agencies and recreation activities, but privilege accommodation units. The region of Douro, by not involving accommodation firms in the creation of new products, may be evolving to a situation that suggests that the new products developed are mostly based in excursions or routes with the aim of visiting cultural or recreational attractions, which could have negative impacts in the number of nights spent in the region and the occupancy rate. In opposition, the respondent firms located in Aveiro consider that lodging facilities are important when creating innovative products, alongside recreation activities, which makes tourists extend their stay in the region. Travel agencies are important in order to promote and sell new products, whether in Portugal or abroad.

New marketing strategies are used as a purpose for cooperation by over half of the surveyed tourism firms. Travel agencies are the main partners for both regions. In Douro, cultural activities, accommodation firms and government agencies are also prominent. In Aveiro, accommodation units appear in second place, followed by restaurants. Universities appear as an important and strategic partner in the region of Aveiro (which is almost residual in Douro) and government bodies seem to play a minor role.

Despite the fact that knowledge creation is a crucial part of the innovation process, it presents lower values when compared to the other cooperation purposes. Nonetheless, nearly 30% of firms from Aveiro selected as the motive for engaging in links with other organisations, surpassing the 21% of responses registered in Douro.

Purpose of cooperation within institutional networks

The sociometric analysis applied to institutions also provided important insights on the main reason that lead to the establishment of cooperation in order to support or develop innovation in tourism. Again, the regions of Douro and Aveiro present different patterns.

In Douro, institutions engage in cooperation mainly for knowledge sharing and knowledge creation. The knowledge sharing network is composed by 89% of the full network actors, connected by 150 ties. It has a centralisation of about 60%, which means that the prominence and power of actors is unbalanced and concentrated in few nodes. Despite being the more important, it is not the most efficient of the five, with an index of 0,852 (below new product and new process development), which means it has many redundant contacts. Knowledge creation emerges as the second most relevant network within the five possible purposes for cooperation: it comprises almost half of the social structure (49%) linked by 80 ties. The knowledge creation function is well distributed among these actors, as the network centralisation rate is of 20,3% (Table 7.15).

The institutional social structure of Aveiro is more dynamic in what concerns the purposes that are on the basis of cooperation for innovation (Table 7.16). In fact, from the five presented purposes, only one does not appear to be very relevant (the development of new processes). Similarly to Douro, the knowledge sharing network presents a dense pattern when compared to the other specific activities networks. It comprises 91% of all actors and 250 ties. It has an average centralisation rate that does not reach 40%, but is the most centralised of the five. In what concerns its efficiency, it registers an index of 0,863 (the second lowest), indicating the presence of some redundant links. The second most relevant specific network is devoted to the development of new products. Despite being significantly smaller than the previous one, it integrates nearly half of the total actors (49,4%), linked together by 124 ties. The centralisation is low (28%), a situation that unveils a strong participation of an increased number of actors. Besides it, it is highly efficient, with an index of 0,954 (the redundant contacts are residual). After sharing knowledge and developing new products, the institutions of Aveiro engage in or support the development of new marketing strategies. More than 48% of the overall institutions are engaged in this cooperation purpose through 122 links. However, its efficiency is the lowest of the five (0,795), despite still higher, but indicating that there are many redundant contacts that may be removed. The centralisation rate is low (32%). The knowledge creation network appears in fourth place, although not having a significant difference from the previous. In fact, the rate of

connected nodes is the same (48,3% of the total), but are linked by a smaller number of ties (100). The centralisation rate is the lowest (15%) and the efficiency rate is close to 0,90.

Both regions present different patterns of relationships within their regional tourism innovation systems: Douro has a higher inward dynamic in terms of tourism innovation, while Aveiro is currently more outward-looking. The Pearson's χ^2 test confirms that there is a statistically significant association between the number of links established with different purposes and the region. The purpose of cooperation is similar in both regions, but is different in Douro and Aveiro according to the partner with which the cooperation is established. In what concerns institutional networks, Douro's institutions are mainly engaged in knowledge sharing and creation, while in Aveiro the institutions are more dynamic in what relates to purposes of cooperation to develop innovation processes: knowledge sharing, new product development, new marketing strategies and knowledge creation are all relevant. The hypothesis that the types of relationships differ across regions is thus validated.

H_6: Regional tourism destinations' innovative performance is higher when there are strong innovation networks within RTIS, based on diverse and strong patterns of collaboration among tourism actors within the network and links with outside partners (small-world networks).

Type of organisations with which there has been cooperation

When analysing the sub-sectors with which the respondents are engaged in cooperation towards innovation, it is concluded that there is diversity in the contacts. This situation results from the fact that, despite some differences in terms of those organisations that register a higher significance as partners, the respondents effectively establish cooperation links with the different presented types of organisations (16 in total), as observed in Figure 6.32, either within and outside the industry. In Douro, links with tourism firms represent 62% of total links, while with non-firm organisations the rate is of 38%. In Aveiro, these values are of 67% and 33%, respectively, which indicates that the patterns of cooperation inside the industry are more pronounced in this region.

Geographical scope of cooperation and linkages

As referred, Douro and Aveiro presents different patterns in what concerns the geographical location of their partners towards innovation. The aggregate of tourism firms located in the region of Douro demonstrate a stronger orientation to be networked with organisations at local and regional level, conversely to Aveiro, whose group of respondent firms present a higher rate of links with external (national and international) organisations (Table 6.9). Thus, it may be concluded that the region of Douro lacks cooperation with external firms in order to assure a wider diversity of the links established with the objective of innovating and avoiding the lock-in of the region. Aveiro presents a more balanced structure regarding the diversity of the geographical scope of its partners. As mentioned above, 63,4% of Douro's links are internal and 36,6% are external. Out of these, only 9% are international. In Aveiro, 46,2% of the established connections are internal and the remaining 53,8% are external, out of which 17,3% are international (nearly the double of the value registered for Douro).

External-Internal Index

The E-I Index is a sociometric measure that allows obtaining the group embedding based on the comparison of the number of external ties to internal ties within different groups in a network. It ranges between -1 and 1 (all ties are established between actors from the same group or all ties are external to the group). This analysis was applied to the institutional networks, for two groups: according to the type of organisations[33] and according to the geographical scope[34] of links (Table 7.4). It was concluded that the E-I Index for the organisations is positive in Aveiro (0,18) and negative in Douro (-0,182), meaning that the number of external links (i.e. with different types of institutions) of Aveiro's institutional network is higher than the number of internal links. In Douro, the situation is the inverse. The institutions comprising the network privilege the contact with similar institutions belonging to the same group.

In what concerns the geographical dimension, both regions present positive indexes. However, Aveiro reveals a higher value (0,643) than Douro (0,212), which indicates that the network has a higher proportion of external links than Douro. This complies with the behaviour of tourism firms and is an advantageous structure towards the development of innovation due to a higher access to new knowledge. On the other hand, the institutions of Douro are more regionally embedded.

[33] Groups of organisations are classified as the following: Knowledge/ Education Organisations; Government/ Public Organisations; Consultants; Business Associations; Innovation Agencies/ Innovation Support Agencies.
[34] Groups of geographical location are classified as the following: local, regional, national, international.

Clustering Coefficient

Aveiro presents a higher clustering coefficient than the Douro region, namely 68% against 57% (Table 7.3). This means that the neighbours of that network are better connected than those of Douro, and that the actors located in Aveiro have a higher probability of being connected to each other. Thus, institutional actors from Aveiro are closer to each other, present more embedded relationships, they easily widespread knowledge and have a higher level of trust. This indicates a higher potential to develop collective learning and joint innovation, as well as creates a stronger regional innovation system

Small-World Coefficient

Small-world structures are considered as the most adequate for networked innovation, as they are characterised by strong clustering and low average path length, a combination that represents dense social structures favouring regional innovation. A social structure is a small world network when the coefficient is greater than 1.

Both regions may be classified as small-world networks. Douro has a coefficient of 7,63 (Table 7.13) and Aveiro of 20,35 (Table 7.14). Aveiro's institutional network is more clustered and is also more efficient in terms of having less redundant contacts. It can be concluded that the institutional tourism innovation network of Aveiro can more easily obtain the advantages deriving from its "small-worldness" and thus present a higher potential for the development of successful regional innovation. In fact, Aveiro has a higher proportion of innovative tourism firms than Douro (84,4% vs. 77%).

Most important knowledge source (geographical level)

In what concerns the perception of surveyed tourism firms about the most important sources of knowledge that contribute to the development of innovation, firms located in Douro assign higher importance to the interaction with national or international organisations (45,6%), that is, they consider it as the most relevant form of access to knowledge that supports the development of tourism innovation. Nonetheless, this contradicts the current pattern of networking, which is, as mentioned, more significant at internal level. The regional tourism innovation system of Douro is in fact regionally embedded. However, the firms show the need to access to new, external knowledge in order to innovate. On the other hand, a significant share of firms (41,7%) believe

that the locally/regionally produced knowledge is the most important for tourism innovation (figure 6.46).

The opposite situation occurs in Aveiro. Despite the fact that the majority of relations within tourism innovation are developed with organisations from outside the regional innovation system, 45,3% of respondents claim that the knowledge resulting from local and regional organisations is the most important (Figure 6.47). This may result from the fact that Aveiro is in a more advanced stage of development and thus has more external connections, and tourism firms may be experiencing the need to engage in closer cooperation with local and regional organisations in order to strengthen the regional tourism innovation system.

The relationships among the organisations located in the region help to create an innovation-friendly environment.

A similar number of tourism firms from both regions agree with this statement (Table 6.19). However, the rate of firms that agree and disagree is not very different, which prevents from concluding in absolute terms that the relationships among local organisations effectively contribute to the creation of an environment that fosters innovation. The conclusion that may be drawn is that this scenario is felt as positive by 42% of respondents from Douro and 39,6% from Aveiro.

Most successful tourist products (goods and services) recently introduced in the region result from the cooperation among different tourism agents.

Nearly half of the surveyed firms from both regions (48,5% in Douro and 49,4% in Aveiro) believe that most successful tourism innovations are developed in cooperation among different organisations (Table 6.19), despite the fact that not all engage in this practice. Thus, cooperation with different firms or institutions may actually increase the innovation performance through the introduction in the market of successful products.

Tourism firms need to establish relationships with organisations located outside their region in order to access to knowledge and information that allows innovating.

The vast majority of firms acknowledge the importance of being connected with external organisations in order to innovate, as this way they can access new and fresh knowledge that will subsequently be widespread through the system and promote collective learning and joint

innovation. In Aveiro, 81,4% of firms said to agree with it, as well as 77% of firms located in Douro (Table 6.19). It is important that regional innovation systems can combine dense regional relationships with external contacts.

Tourism firms from both regions present diversity in terms of the type of organisations with which they cooperate. In terms of the geographical location of the partners, Aveiro presents a more balanced distribution, as the rate of cooperation with organisations from all geographical locations is very similar. The External-Internal index shows that the institutional network of Aveiro has a positive and higher index, meaning that the institutions cooperate with others that belong to different groups in terms of types of institutions and geographical locations. The institutions from Douro are mainly linked with similar institutions (from the same group of organisations and also from the same geographical location). The cluster coefficient is also higher in the network of Aveiro, thus institutional actors have more embedded relationships, higher trust levels and more dynamic knowledge sharing. Both regions may be characterised as small-world networks, however, Aveiro presents a higher coefficient. Subsequently, it has a higher innovative potential.

It may be concluded that the region of Aveiro is endowed with a stronger regional innovation system, due to the higher diversity that firms and institutions present in terms of cooperation with different types of organisations, and from different locations. Considering that Aveiro has a higher percentage of innovative tourism firms, this hypothesis is considered as validated.

H_7: Destination management organisations or public organisations performing destination management functions are the most prominent in tourism innovation networks.

Degree centrality (most central actors)

The institutional actors that present the highest centrality in Douro are the following, by descending order of importance: (i) North Regional Coordination and Development Commission (*CCDR-N*); (ii) Douro Regional Tourism Board; (iii) CIMDOURO (Association of municipalities of

Douro); (iv) Douro Hospitality Training School; (v) AEHTDOURO - Association of Businesses of Hospitality and Tourism of Douro; and (vi) Regional-Directorate for Culture of Northern Portugal. These actors are all public entities, with the exception of the AEHTDOURO, which a private association that represents tourism firms and organisations. Together, these institutions concentrate nearly 50% of total degree centrality of Douro institutional tourism network.

In Aveiro, the most prominent actors are: (i) Regional Tourism Board (TCP); GOVCOPP (Research Unit in Governance, Competitiveness and Public Policies of the University of Aveiro); (iii) the University of Aveiro, (v) Bairrada Wine Route (Wine tourism Business Association); (vi) IDTOUR (R&D tourism spin-off company; (vi) EFTA Tourism Training School; and (vii) PRIVETUR (rural tourism association) The most central actors represent a share of 54,1% of total degree centrality.

There are important differences between both regions (section 7.2.1). In Douro, the most influential and prominent actors are public entities (with the exception of one). In Aveiro, the actor that has the highest centrality is also public (Regional Tourism Board for Central Portugal). However, those who follow are also public, but perform different functions, as they are knowledge producers, namely the GOVCOPP research unit and the University of Aveiro that appear in second and third places. It is also worth highlighting that the spin-off firm IDTOUR has also an important centrality degree. Other actors such as EFTA (private training school), the Bairrada Wine Route (public/private) and the PRIVETUR association are also influential actors within Aveiro's tourism innovation system.

To conclude, while in Douro the governmental actors are the most central, and thus, powerful and influential for tourism innovation, in Aveiro the knowledge/education system stands out alongside the Regional Tourism Board. This situation may derive from the fact that Douro, as a tourism destination, is in an early stage, which calls for a higher public and governmental intervention. In what concerns betweenness and closeness centrality, the results are not different.

The most central actors in the Douro institutional network are in fact public organisations with destination management functions. In Aveiro, the most central actor is also a public organisation (Regional Tourism Board), however, this institution is closely followed by knowledge producers in terms of centrality. Thus this hypothesis is only partly validated, as it is true for the network of Douro, but the relevance of public/governmental agencies in Aveiro is inferior when compared to knowledge institutions.

8.4 Regional embeddedness of tourism innovation

Objective 3: Embeddedness – To determine the importance of the region and of regional specific factors for tourism innovation.

H_8: Regional specific factors play a significant role in supporting the development of innovation by tourism firms.

Importance of regional specific factors for innovation

According to the territorial innovation models, regional endogenous factors are unique and strongly influence the potential and the environment for the development of systemic innovation. A list of specific factors was identified in the literature and included in the survey (see appendix 5). The results given by firms from both regions are similar. All factors present average values above 2,5 (from 1 to 5), meaning that they are provide significant contributions for tourism innovation. Nonetheless, natural resources and human capital stand out with the highest averages, as well as the regional knowledge infrastructure is emphasised by firms located in Aveiro. Considering the overall items, Aveiro grants a slightly higher importance to regional specific factors and their role in tourism innovation, with an average of 4,1, compared to the 3,9 registered for Douro (Figure 6.48).

Actors that usually introduce innovation in tourism

The location of the actors that usually create innovative products and services can also be an indicator of regional embeddedness of tourism innovation. It is recognised by 62% of respondents in Douro and 53% in Aveiro that local and regional firms are the main promoters of tourism innovation, followed by local and regional public agencies. If public and private local and regional organisations are considered together, they represent 77% of tourism innovations in Douro (Fiure

6.49) and 70% in Aveiro (Figure 6.50). In conclusion, in what concerns the entrepreneurship and the organisations that introduce and foster tourism innovation, it is highly regionally embedded.

The statement "***In my region, I find the necessary conditions to develop tourism innovations***", aimed at analysing the access to resources, means and conditions supporting innovation by tourism firms. The results are similar for both regions and demonstrate that there is higher percentage of firms that disagree with the statement that those that agree (Table 6.18), which indicates that there is a significant proportion of firms that feel that the region still has to evolve in order to offer the optimal conditions for the development of tourism innovation.

To sum up, Aveiro presents a higher regional embeddedness of tourism innovation in what concerns the regional specific factors, but when it comes to analysing the organisations responsible for introducing innovation, the Douro region relies more on local and regional structures than Aveiro, although both present very similar opinions. Regional specific factors are more supportive of tourism innovation in Aveiro, while regional organisations play a more significant role in Douro. It may be said that tourism innovation in Aveiro is context-driven and in Douro is mainly organisational-driven.

All regional specific factors present average values above 3,5 (between 1 and 5), indicating that most firms view them as important to regional tourism innovation. Some of these factors achieve very high averages, such as natural resources, human capital, culture of cooperation and shared values and attitudes (above 4).

The actors that introduce innovation in both regions operate at local or regional level (either public or private). The most central actors in institutional networks are also classified as local and/or regional. It is proved that regional specific factors play an important role in supporting tourism innovation and that it is regionally embedded. The hypothesis is validated. However, it should be noted that many firms believe that their regions need to evolve in providing the optimal conditions for the development of innovative processes in tourism.

8.5 Importance of knowledge for tourism innovation

Objective 4: Knowledge – To determine the importance of localised knowledge for tourism destinations' innovation.

H_9: Tacit knowledge plays a more important role for tourism destinations' innovation than codified knowledge.

Most important sources of knowledge for innovation

Several different sources of knowledge were presented to the respondents, who were asked to select the three most relevant for tourism innovation. Although with different proportions, the results are similar for both regions: internal sources (human resources), customers and personal and informal contacts are the main suppliers of knowledge used for innovation (Figure 6.45). These sources may all be classified as tacit knowledge. On the other hand, codified knowledge sources (R&D and globally available information) register the lower values. It is interesting to note that there are no significant differences between regions.

All the sources of knowledge considered as the most important for tourism innovation are classified as tacit knowledge types, which allows validating the hypothesis.

H_{10}: Local knowledge plays a more significant role for tourism destinations' innovation than outside knowledge.

Origin of human resources with tourism background

In both regions, the majority of the human resources hired by tourism firms were trained by universities and/or schools located in that same region. Specifically, in Douro 75,3% of firms perform this practice and in Aveiro, 74,4% (Figure 6.44). This clearly demonstrates the value that tourism firms assign to local human capital, which is also one of the most important knowledge sources for innovation, as mentioned above.

Geographical location of most relevant sources of knowledge

As already referred, the majority of tourism firms located in Douro effectively has a higher interaction with local and regional entities. However, most of them believe that links with national or international organisations can provide access to knowledge that is more relevant to

the development of regional tourism innovation (Figure 6.46). The pattern observed in firms located in Aveiro demonstrates the contrary. Most of these firms present relationships with external organisations, but consider that the knowledge that may be created and shared among local and regional organisations may bring more important contributions to tourism innovation, which may indicate that the region lacks or needs a denser internal network (Figure 6.47).

The relationships between tourism firms and other regional organisations allow the exchange of knowledge and information that leads to learning and innovation.

Considering the totality of respondents, 62% sustain that the establishment of a regional tourism network boosts the transfer of knowledge, collective learning and the subsequent development of innovation. It is a fact that networked relationships (either formal or informal) are based on trust and reciprocity and thus foster a higher interaction and closer ties within innovation processes. There is, however, a higher percentage of firms that agree with this statement in Douro (66,4%) than in Aveiro (56,4%) (Table 6.19).

Universities and research centres located in the region provide tourism-related knowledge that meets the needs of tourism organisations.

The results obtained for this statement were significantly different between the two regions. In Aveiro, 40% of the respondents agree that knowledge producers located in the region create and share knowledge that is important for their firms and for the development of innovation within the industry. In Douro, the value decreases to 30% (Table 6.19). Within this context, it is worth highlighting the role of the University of Aveiro and the GOVCOPP research unit, as well as to refer that the interaction and the alignment of interests between tourism firms and academics appears to be increasing. Obviously that the fact that the University of Aveiro has a well developed tourism area highly contributes to this situation.

This hypothesis cannot be validated. Despite the fact that the majority of human resources obtained their degree in tourism in regional universities and/or training schools, in what concerns the geographical location of knowledge sources, both internal (local and regional) and external (national and international) are considered as equally important. In terms of the relationships with regional organisations leading to innovation, a significant number of firms consider them as relevant, but they do not exclude a similar importance of relationships with external organisations, regardless of the fact that regional universities and research centres meets the needs of 40% of firms from Aveiro and 30% from Douro.

8.6 Regional Tourism Innovation Systems and destination development

Objective 5: To evaluate how Regional Tourism Innovation Systems influence destination level innovation as tourism destinations evolve.

H_{11}: Regional Tourism Innovation Systems may help to prevent destinations from declining and boost their rejuvenation (during stagnation stage and promote redevelopment or adjustment of destination).

When the number of tourists stagnates or decreases, the firm introduces an innovation in order to rejuvenate the destination and to attract more tourists.

As argued by Brooker and Burgess (2008) when tourism destinations reach a declining stage, some sort of strategy should be brought in order to contribute to the rejuvenation of the destination. Among others, the development of incremental and radical innovations, the diversification and differentiation of tourism products and services stand out.

In this study, about 60% of the firms assume to have introduced some type of innovation in order to attract more tourists when numbers are decreasing in order to contribute to the rejuvenation of the destination, its image and positioning (Table 6.20). The researcher was able to conclude that there is a statistical significant association between the introduction of innovations when the tourists' numbers are declining (agreement with the statement) and the development of new products (p=0,044; df=2; χ^2=6,239), new organisational forms (p=0,037; df=2; χ^2=6,615) and new marketing strategies (p=0,001; df=2; χ^2=13,137).

The introduction of tourism innovations is only important when the destination is declining in its physical set and in numbers of tourists.

The majority of respondents (85,3% from Aveiro and 76,6% from Douro) believe that innovation is important in all stages of tourism development, and not only when the destination is facing the decline stage (Table 6.20).

The hypothesis is validated: most firms introduce some type of innovation when the number of tourists is declining. In Douro, product innovation is the main strategy, while tourism firms located in Aveiro mainly decide on new marketing strategies. It is also important to refer that a vast majority of firms consider that innovation is important throughout all the stages of development of the tourist destination, and not only when it

H_{12}: As tourism destinations evolve, organisations feel an increased need for developing joint innovations or strengthening innovation networks within Innovations Systems.

As the number of tourism organisations grows in the region, cooperation among different organisations also increases and becomes a common practice.

Several authors (Brooker & Burgess, 2008; Faulkner & Tideswell, 2005; Skinner, 2000; Tinsley & Lynch, 2001) argue that, in order to achieve sustainable development in tourism destinations, it is necessary to establish a collaborative network among tourism stakeholders. The results show that in Douro, nearly 40% of tourism firms agree that the development of tourism industry has a positive impact in cooperation practices. However, there is a similar number of firms that disagree (41,5%). In Aveiro, it was expected that a significant number of respondents consider that alongside the growth of tourism firms would increase the collaboration among them, since it is a more developed destination. Conversely, only 29% of firms agree with it, against 41% that disagree (Table 6.20). In conclusion, the growing and development of a tourism destination is not effectively fostering cooperation among local organisations.

Geographical scope of cooperation

It was already mentioned that firms located in Douro privilege the relationships with local and regional organisations, while their counterparts in Aveiro are more focused on external links (at national and international level). It was also found that, despite these networking patterns, Douro's tourism firms consider that national and international organisations are more important sources of access to knowledge fostering innovation, and the opposite occurs in Aveiro, where the majority of firms state that the knowledge of local and regional (internal) organisations can provide a higher contribution to the development of regional innovation. In conclusion, both regions need to strengthen their innovation systems and "upgrade" them into more efficient, effective and competitive structures within the development of regional innovation: the tourism

destination of Douro needs to reinforce the links with external organisations and Aveiro needs to increase the tourism destination's internal network.

This hypothesis is not confirmed. According to the obtained results, the increasing in the number of tourism firms is not a factor that propels the need for developing innovations in cooperation neither for strengthening or increasing the tourism innovation network and the levels of cooperation.

8.7 Conclusion

The hypotheses presented tested in this chapter were defined subsequently to a in-depth literature review on several topics, amongst which the most relevant are the ones related to tourism development, innovation process, networks and regional innovation systems. These hypotheses are closely linked to the objectives of this thesis, as observed in table 5.4.

The testing of the hypotheses is achieved with recourse to literature review and especially to quantitative data analysis resulting from the applied surveys. Several statistical analyses are performed in order to achieve this goal. In some cases, the significance level of statistical parametric and non-parametric tests allows to validate or reject the hypothesis, while in other situations this process is attained with descriptive statistics. Either way, each objective has one or more related hypotheses, which in turn are connected to specific questions from the survey, transformed in variables that were analysed with the most adequate statistical procedures. The methods used are conclusive and robust, providing results that enabled the testing of hypotheses.

The overall results support most of the defined propositions. It is possible to conclude that the types and characteristics of tourism innovations (H_1) and their economic significance (H_2) are different across regions and according to their stage of development. It is only possible to partly confirm that innovation activities vary in function of the same criteria (H_3).

The network-related hypotheses are also validated. It may be thus assumed that the structure (H_4) and the types of relations (H_5) that characterise regional tourism innovation systems change across regions, indicating that there is no inflexible model. However, the results point to which

may be more adequate practices that lead to a successful innovative performance of tourism destinations. It is confirmed that it is higher when there are strong regional innovation systems based on the diversity of cooperation patterns with actors within the network and links to outside partners (H_6). It was also partly substantiated that public organisations that perform destination management functions are the most central and prominent actors in the network (H_7), as it is true for Douro, but not for Aveiro.

The fact that there is no specific or pre-determined model for regional tourism innovation systems results in part from factors that are specific and unique to each region. It was possible to confirm that these factors play a significant role in supporting the innovations developed by tourism firms (H_8), and thus influencing the overall destinations' performance.

As mentioned, knowledge is the most fundamental resource for innovation. The difference between tacit and codified knowledge as sources for the development of innovations are analysed, and it is hypothesised that tacit knowledge plays a more significant role within tourism innovation that its codified form (H_9). This is confirmed through the validation of the related hypothesis. It was also assumed that local knowledge is more important that outside knowledge (H_{10}). Contrarily to the previous proposition, tourism firms believe that the opposite is true, as they grant higher relevant to external knowledge as innovation source. This hypothesis is thus rejected.

Finally, in what concerns to the role that innovation plays in the development of tourism destinations, the hypothesis assuming that regional tourism innovation systems may prevent destinations from decline and foster their rejuvenation (H_{11}) is validated. Despite it, results show that the evolution of destination areas do not further the need to develop joint innovations or strengthening innovation networks (H_{12}), reason why this proposition is rejected.

Chapter

9

Main findings and conclusions

9.1 Introduction

This thesis sought to provide a deep understanding on innovation in tourism developed at regional level, within cooperation networks and framed by the dynamics underlying the regional innovation systems approach. This was accomplished based on empirical evidence collected from tourism firms and institutions located in two regions: Douro and Aveiro, which provided a basis for comparing the results. This chapter presents the main findings and conclusions of the thesis (sections 9.2 and 9.3), discusses the contributions of the research both for academic knowledge and industry practitioners (section 9.4), and presents the limitations of the thesis. Furthermore the chapter provides some suggestions for future research in this field of study (section 9.5).

9.2 Firm-level outcomes and regional innovation framework

One of the central objectives of the thesis has been to analyse the dynamics that characterise innovation developed by tourism firms, with a special focus on the innovation processes occurring within networks of collaboration. It was also an important objective to understand tourism innovation within a more comprehensive approach, based on territorial innovation models, namely the regional innovation systems. Bearing this in mind, a survey was conducted among tourism firms at the Douro and Aveiro regions. The results offer important insights on the characteristics, dynamics, factors and processes related to innovation in tourism industry.

Contrary to the assumptions made by several authors that consider tourism as a low or non-innovative industry, it is found that tourism firms do innovate. Results from primary data collection allows to conclude that the majority of tourism firms developed and place in the market at least one type of innovation at the least every three years. Chi-squared Pearson's test results indicated, however, that being innovative depends on the tourism sub-sector.

When comparing both regions, Aveiro emerges as having a higher share of innovative tourism firms and also of major innovators, which demands for the engagement in new knowledge creation and sharing. Product and marketing innovations are the most significant in both regions, while process innovation stands out in Aveiro. This leads to the conclusion that the type of innovation may depend on the destinations' stage of tourism development. Bearing this in mind,

the governance of tourism regions may have to consider the implementation of different innovation strategies and policies in order to ensure sustainable and competitive forms of development.

The majority of firms that innovate do it in cooperation, as they are part of a tourism innovation network. Cooperation with other tourism firms is higher than with non-firm organisations, with the exception of government agencies or public agencies (mainly in Douro). In what relates to the geographical scope of the partners, it is found that the links established by tourism firms located in the region of Douro are mainly internal (with local or regional organisations), while Aveiro presents a more outward pattern, as the majority of the links are directed to external (national and international) partners. The most significant purposes underlying cooperation towards tourism innovation are knowledge exchange, new product development and new marketing strategies in both regions. It is worth referring that knowledge creation achieves higher importance in Aveiro. In the Douro region, cooperation is established mostly with tourism firms within all the purposes, except for funding, in which firms chose almost exclusively non-firm organisations. In Aveiro, the links to non-firm organisations surpass the cooperation with tourism firms when it comes to funding and also for knowledge creation. In this context, the role of the University of Aveiro and its tourism research unit should be highlighted.

Knowledge-related processes are, as mentioned before, the main processes that support the development of innovation. Regional knowledge plays a significant role as the propeller of innovation and as fostering the regional embeddedness of innovative activities. Tourism firms located in Aveiro and Douro are consensual in what relates to the most important sources of knowledge used for the development of innovations: knowledge embodied in human resources, customers and personal or informal contacts (social capital resulting from the engagement in informal networks). All these sources may be classified under tacit knowledge. Thus, geographical proximity, trust, reciprocity and networks are fundamental for the development of regional innovation in tourism industry. When considering the geographical location of knowledge sources, the combination of internal and external sources provide the diversity needed for the access to new knowledge that will result in innovation and avoid destinations lock-in and decline. It is relevant to emphasise that while the region of Douro presents a pattern characterised by a majority of links with local and regional organisations (having thus less external relations), it considers that the cooperation with organisations located outside the region may present a

higher value in the access to new knowledge. By way of contrast, the region of Aveiro presents significant relations with organisations operating at national and international levels, and thus a significant share of tourism firms consider that the cooperation with local and regional organisations are extremely relevant as knowledge sources in order to develop tourism innovation.

This leads to the conclusion that the regional tourism innovation system of Douro is actually regionally embedded, but that many firms feel the need to access knowledge produced by external or foreign organisations in order to continue developing innovations in tourism. However, an also significant share of respondents considers that the interaction with local or regional organisations is the most important knowledge source. The fact that Aveiro is at a more advanced stage of development and thus presents more external links, may explain the need to engage in a higher number of internal links with the objective of strengthen the regional tourism innovation system.

It is acknowledged that each tourism region is unique and endowed with specific attributes impossible to reproduce. These attributes or resources play an important role in defining the innovations developed at regional level. However, the literature review allows identifying a group of more comprehensive factors that influence the innovation environment and that frame the overall conditions that characterise the regional innovation system. These factors are considered to be relevant to tourism firms and effectively creating innovation-friendly conditions, as they all present high averages in a scale of importance. This situation points towards the regional embeddedness of innovation processes. It should be highlighted that, despite the overall results, natural resources, human capital, shared values and a culture of cooperation emerge as the most significant. In Aveiro, knowledge sharing stands out when compared to Douro.

Moreover, the overall results indicate that Aveiro grants a slightly higher importance to the group of regional specific factors that foster tourism innovation. When considering each item in isolation, it is also evident that Aveiro registers higher average scores in most factors. It may be concluded that, concerning the relevance of regional specific features, tourism innovation is more regionally embedded in Aveiro than in Douro.

In both regions, the development of tourism innovations is mostly conducted by local and regional firms. Local and regional public agencies are the second most important actors. If both types are computed together, one may reach the conclusion that regional organisations assume an overwhelming share of responsibility in creating innovative initiatives in tourism.

To sum up, Aveiro presents a higher regional embeddedness of tourism innovation in what concerns the regional specific factors, but when it comes to analysing the organisations responsible for introducing innovation, the Douro region relies more on local and regional structures. Regional specific factors are more supportive of tourism innovation in Aveiro, while regional organisations play a more significant role in Douro. It may thus be concluded that tourism innovation in Aveiro is more context-driven and in Douro is mostly organisational-driven.

Finally, the main conclusions on the perception of tourism firms regarding the regional innovation environment are presented. It is found that most firms feel that the region does not offer the necessary or optimal conditions to the development of innovation. If this is compared to the results obtained for the importance of regional specific factors, it is observed that the presence in the region of similar organisations (a tourism cluster) and the existence of a regional governance structure that fosters innovation are the items that register lower values, and thus considered to be the least important and providing minor contribution to tourism innovation. This is also confirmed by the higher share of firms that consider that the growing of a tourism cluster in their regions does not effectively foster cooperation towards innovation at a large scale.

The conceptual and theoretical insights on territorial innovation models and on the impact of networks on innovation support that firms engaging in collaborative processes with other organisations have a higher potential to increase their innovative performance. Moreover, the existence of such relations helps to create robust and successful regional innovation systems. A substantial number of firms consider that the relationships established among the organisations located in their regions lead to the creation of an innovation-friendly environment. However, a similar, although lower, share of firms does not agree with it. It is not, thus, a consensual issue for both regions. Nonetheless, the vast majority of respondents agree that these relations lead to knowledge exchange that result in learning and innovation.

When trying to understand if the most successful tourism innovations result from the cooperation among different organisations, it is concluded that this is true for nearly half the firms in Douro and Aveiro. These results point towards the increased economic significance of tourism innovation developed in cooperation, against innovative tourism products and services placed in the market by tourism firms in the context of individual and atomistic processes.

Tourism-related knowledge produced by universities and research centres has different levels of importance and contribution for tourism innovation between both regions, being higher in Aveiro. About 40% of tourism firms located in this region agrees with the point of view that the knowledge produced by universities meets their needs when it comes to developing innovations.

It is also worth referring that a vast majority of firms agree with the need to establish relations with outside organisations in order to access to new knowledge and information that allows developing innovation in tourism.

The association between innovation and the development of tourism destinations is clear for the surveyed firms. Most of them claim to have developed and introduce an innovation in order to avoid the decrease in the number of tourists when that started to happen. However, innovation is considered by them to be crucial for the development of tourism destinations at all stages of the life cycle, and not only when it is entering the decline phase.

9.3 The contribution of institutional networks for regional tourism innovation systems

When reviewing the literature on territorial innovation models, and especially on regional innovation systems, it was concluded that innovation is an interactive process and that results from the collaboration established among organisations. Relations are the core of regional innovation systems. On the other hand, the existence of a strong institutional setting engaged in the development of tourism innovations within a networked structure is central to the establishment of solid and successful regional innovation systems. Bearing this in mind, the networks of institutions playing a role in tourism and in regional innovation were analysed. This study unveiled interesting conclusions regarding the “institutional thickness” and the creation of an institutional network supporting and fostering regional tourism innovation.

Being part of a network brings innumerable benefits not only to individual actors, but also for the tourism destination as a whole. When analysing innovation systems, one cannot be detached from the conditions that the "territories" (in *latu sensu*) provide to the development of innovation. In tourism, this is especially important, as it is a very fragmented industry that needs additional efforts in order to reconcile the interests of all tourism stakeholders. Moreover, tourism is highly dependent on the territory and on the several dimensions it embraces. Solid institutional networks can bring important contributions for the innovative potential of tourism firms and regions, by engaging in innovation processes and creating the necessary optimal conditions within the region, supporting and fostering innovation at regional level. As argued by Cooke (2001), it is crucial to assure public innovation support systems alongside strong institutional and organisational support from the private sector.

The analysis of the institutional networks of the regions of Douro and Aveiro bring relevant insights into the structure, composition and operation within innovation processes at regional level. A first conclusion is that there is no single model of an institutional network of innovation. Both regions present distinct social structures, each one providing different benefits and impacts for the development of tourism innovations.

The network of Aveiro presents a larger dimension in terms of the number of actors and of the links among them. It is comprised by 87 nodes and 314 links, while the network of Douro includes 55 actors linked by 274 ties. In what concerns the composition of these structures in terms of the type of actors and their geographical location, they also present significant differences. The network of Douro is considered to be unbalanced, as 78% of the actors are local or regional, and more than half (53%) are classified as public sector/ governmental institutions. In Aveiro, a more unbiased structure is found: in what concerns the geographical scope of the actors, they are well distributed by the four categories (local, regional, national and international). Public sector organisations stand out representing 45% of all actors, but knowledge producers and private sector institutions are also fairly represented with respectively 25% and 23%. It is worth referring that 55% of Aveiro's network comprises national and international actors. This structure presents a higher variety in terms of actors, granting access to wider knowledge sources. This is positively related to regional innovative potential. Once this knowledge is spread throughout the network, collective learning processes take place and organisations become recipients of new knowledge and ideas that can be transformed into successful innovations.

The analysis of centrality allows identifying the position of individual actors in a social network. It was hypothesised that the most central actors (those who account for a higher number of direct links) are those performing destination management functions. In Douro, it is found that six actors assemble half of all the ties present, which means that prominence and power are highly concentrated in a few nodes. These are mainly public organisations that indeed have responsibilities related to tourism destination's management and planning. The two most central actors are the North Regional Coordination and Development Commission (CCDR-N) and the Douro Regional Tourism Board. It is worth referring that the Porto and Northern Portugal Tourism Board play a minor role in the Douro's innovation network, and is frequently peripheral.

In the institutional network of Aveiro, eight actors stand out as having the highest level of centrality. Destination management organisations (namely the Regional Tourism Board) have a significant position, but prominence and power is shared with R&D, knowledge and education institutions, namely the University of Aveiro, the GOVCOPP research unit and the spin off firm idtour.

As a result of their centrality, these actors are the most active in their networks. They have access to more information, knowledge, resources and exert more control and influence over other actors, as they can reach a larger number of individuals. They are also less dependent on a few specific actors. Therefore, they are in an advantageous position for knowledge acquisition and sharing and to promote collective learning, which are fundamental processes underlying innovation. It may be thus concluded that in Douro, regional tourism innovation is mainly supported by public organisations, while in Aveiro, beyond them, knowledge producers also play an equally significant part.

The connectivity of the overall network is also an important measure to be taken into account. Connectivity is about the extent to which subsets of actors are cohesive, that is, a network is connected when there is a path between each dyad, which means that all pairs of nodes are reachable. Different levels of connectivity have distinct impacts on how information, knowledge and innovation flow easily within the network and reach all actors. The higher the connectivity, the more accessible these resources are to all actors in the network.

In the Douro region, almost every actor presents more than one alternative to reach another in the network, which ensures that resources in general, and knowledge in particular flow easily and with few obstacles. It should be noted, however, that a few nodes (13) show weak connections within this network. These are more vulnerable actors, as they present a single or very few connections with any other actor. One can highlight mainly international and national level organisations. At regional level, organisations representing cultural products and services are extremely dependent on few actors.

The patterns of connectivity observed in the Aveiro network are quite distinct from Douro. Out of the 87 actors that comprise this network, 43 enclose one single connection to every other node. This means that almost half of them have only one option to obtain information from all other actors and are, therefore, in a fragile position. Most of them are located outside the region. Conversely, the organisations placed in more robust positions are also those who have higher centrality degrees. Within this context, the spin off idtour stands out, as it is responsible for establishing the connection of several actors with a line connectivity of 1 with the rest of the network members. It plays a central role as a broker in the sharing and dissemination of information and knowledge throughout the tourism innovation network.

In this network, less connected nodes are mainly public organisations, business associations and higher education organisations located outside the region (at national and international level), with the exception of foreign universities linked to the University of Aveiro, which are more well connected.

It should be mentioned that less connected nodes should not be undervalued, as they may play a central role in other networks, and therefore can act as important sources of introduction of new knowledge and foster the development of tourism innovation. In other words, they may act as brokers.

In what concerns the clustering coefficient, the network of Aveiro presents a higher index than Douro, meaning that the neighbours of the former network are better connected than those of the later. Subsequently, the institutions of Aveiro have a higher probability of being connected to each other which results in more embedded relations, easier widespread of knowledge and higher levels of trust and reciprocity among individuals and organisations. This increases the

potential for collective learning and for the creation of optimal conditions for the development of interactive tourism innovation. The network, and consequently the regional innovation system are more robust and less vulnerable. Bearing this in mind, one may conclude that Aveiro institutional network is in a more favourable position for fostering a solid tourism regional innovation system, as it is more clustered than Douro. Despite this, both networks present high levels of clustering which unveils a pattern of cohesive networks.

The embeddedness of relations developed within innovation processes is analysed with the Internal-External Index, which is based on the comparison of the number of external ties to internal ties within the groups of the types of institutions and geographical scope. It is found that Aveiro reveals a higher index than Douro in both dimensions. This situation appears to be the most suitable for the development of innovation, considering that actors can access different types of knowledge from different sources, fostering the combination of this knowledge into new tourism products and services. However, internal ties are still present, which enables the diffusion of knowledge throughout the network, provided that it is densely connected.

In what concerns the cooperation patterns according to the geographical location of the actors, the network of Douro is mainly characterised by the links established between regional actors and between the local and regional organisations. The ties with national and international organisations are residual. This unveils a high regional embeddedness of relations within tourism innovation processes. In Aveiro, regional actors are the propellers of the tourism innovation dynamics. They are connected with organisations from all the geographic levels. This network also presents a significant level of regional embeddedness. However, it has the advantage of being engaged in external relationships that introduce new knowledge and foster innovation.

Regarding the cooperation among different types of organisations, the tourism innovation network of Aveiro presents a higher diversity of links among the different groups when compared to Douro.

The analysis of structural holes and brokers is complex and involves a wide range of metrics that offer diverse conclusions. This was studied in detail and allowed drawing important insights. The main conclusion is that the network of Aveiro has a higher number of non-redundant contacts (245,2) than Douro (202,1), which means that it is more efficient as it channels its “energy” and

investment to the right direction. The actors obtain higher impact for each unit invested in the ties. The more efficient a network is, the higher is the access to structural holes and subsequently, to new and diverse sources of knowledge.

Finally, each of the five identified specific activities[35] that underlie and support innovation was treated as a single network and they were subsequently subject to a comparison. The results obtained allow concluding that in Douro, the knowledge sharing network is by far the largest when compared to the other. It comprises 89% of the actors of the overall network and nearly 55% of all ties. Knowledge creation appears in second place and includes 49% of actors. The development of new products, processes or marketing strategies are endowed with minor importance.

Again, the region of Aveiro is characterised by the diversity, this time in what concerns the innovation activities, as out the five, only one (new process development) appears to have minor importance. Similarly to Douro, knowledge sharing is the largest structure by absorbing 91% of all actors and 80% of ties. The networks aiming the development of new products, new marketing strategies and knowledge creation include half of the overall network's actors. The region of Aveiro is endowed with a higher dynamic from the institutions in the creation of an environment with conditions that foster innovation at destination and firm-level.

It may be concluded that the regional tourism innovation system of Douro is almost exclusively **knowledge-driven**. It relies essentially on knowledge creation and sharing, which means that the inputs for regional tourism innovation are being employed in the tourism innovation network, but the dynamics that transform these processes into effective innovation outputs – new products, new processes and new marketing strategies, are not endowed with the same collaborative nature. New tourism products, processes and marketing are developed in a more atomistic way by tourism organisations.

In opposition to this, and despite the importance that knowledge creation and sharing register in Aveiro (also higher than in Douro), it is concluded that this region has found the mechanisms to transform knowledge creation and sharing into effective and tangible innovation outputs such as

[35] Knowledge creation, knowledge sharing, new product development, new process development and new marketing strategies.

new tourism products, processes and marketing strategies. Thus, it is **knowledge** and **output-driven**. Knowledge related processes are extremely important, as they set the basis for the development of innovation. However, if firms and organisations are not able to find ways to effectively create innovations and place them in the market, their performance can be severely held back.

9.4 Thesis originality and contribution

This thesis aims to provide an in-depth understanding of regional innovation systems in tourism. Under this broad research objective it has explored a number of key dimensions that bring contributions to the academic knowledge and to tourism industry practitioners.

One of the first findings, and that is supported for authors and researchers in this field of study, is that research on innovation in tourism is not at all abundant, both at the conceptual and empirical level. The literature review was conducted from an overall to a narrower approach and involved several scientific fields, such as tourism, geography, planning, development, innovation, economic geography and social network analysis. It is, therefore, an interdisciplinary study that employs and combines theories and methods from different disciplines.

This approach is well observed in the literature review, as showed in figure 5.5. The first chapter (chapter 2) discusses the overall meaning of development and the several dimensions it may assume. This creates ground for the analysis of the development of tourism destinations, which is undertaken by reviewing the main theories and models describing their evolution. It is found, at this point, that the Tourism Area Life Cycle Model (Butler, 1980) is the most comprehensive and widely used model. Besides considering the elements of tourism supply and demand, it postulates that tourism destinations will inevitably follow a path towards decline, unless redevelopment strategies are introduced in the post-stagnation phase. This creates a framework in which innovation should be included in order to avoid the decline. However, some criticisms were made, which brought us a complementary point of view (which later proved to be eventually be the most suited to tourism industry). This perspective is unveiled by Haywood (1986) who argues that different tourism destinations follow different and alternative evolution paths and that the s-shaped curve generalised by the TALC model is not applied to all destination areas. Some

destinations may even not suffer the effects of a decline stage, presenting constant cycles of growth. Therefore, innovation, which is considered by Schumpeter (1982) and Rostow (1990) as the propeller of economic and social development, should be a regular practice to be implemented by tourism destinations and firms at all times. Also, the reducing of the time-span of the life cycle of products due to the rapid mutation in consumers' motivations demands for strong dynamics in what concerns integrated tourism experiences at destination-level in order to maintain its competitiveness.

Bearing these considerations in mind, an in-depth study of innovation was made on chapter 3. The evolution of innovation practices followed a path beginning on linear models, in which firms innovated through a sequential process limited to the inner-firm, passing to interactive and integrated approaches, and reaching the most recent models based on networking, social capital and collective learning which highlights the importance of the territories surrounding firms. Organisations do not innovate in isolation, but in cooperation with others within a space of support highly connected to the territory. The most influential theories and models of territorial innovation systems are thoroughly analysed to lead one to conclude that regional innovation systems model is the one presenting higher potential for application to tourism.

In chapter 4, the regional innovation systems model was analysed. All its key dimensions, underlying processes and dynamics were studied in order to define its application to tourism, focusing namely on (i) the components of RIS, which allowed identifying its main actors; (ii) the systemic dimension of innovation that meets the systemic perspective of tourism; (iii) the functions and activities that innovation systems should perform; (iv) the geographical boundaries, discussed under the point of view of the definition of regional tourism destinations; (v) the approach to the relations established among actors, that should be materialised in innovation networks; and finally (vi) the role of knowledge and learning central processes of innovation systems. The outcome of this analysis was the development of a framework for a regional tourism innovation system, composed by actors engaged in networks, regional conditions that foster tourism innovation and processes related to knowledge creation, sharing and collective learning, resulting in innovation. This framework brings contribution at two different levels: first, it provides a model for understanding the dynamics of tourism systemic innovation, by identifying its main actors, the necessary conditions and emerging processes leading to innovation; and second, it provides a conceptual model for empirical research on tourism innovation systems.

The adopted research process was based on quantitative methods and included two complimentary empirical studies: one provide the characterisation of innovation processes conducted by tourism firms and the other gives relevant information about the institutional framework of regional innovation systems. Both were applied to the regions of Douro and Aveiro. The data analysis procedures combined descriptive and inductive statistics (applied to the firms' survey results) and social network analysis methods which were used to characterise the network dynamics of institutions related to tourism and regional innovation. As already mentioned, the quantitative studies on tourism and regional innovation systems are almost inexistent, especially those who resort to social network analysis. This allowed the development and validation of quantitative methods and techniques that can be used in future research on this topic.

The results of the empirical studies provided useful insights on how Portuguese tourism firms behave in terms of innovation developed in cooperation and how Portuguese regions support regional tourism dynamics through their institutional set up. More specifically, important conclusions were draw on the innovation performance of tourism firms, the patterns of networking towards the development of regional-level innovation, the importance and influence of regional knowledge and processes related to knowledge creation, sharing and collective learning on the development of innovations, how regional specific factors and conditions shape the innovation performance of tourism destinations, the role that innovation plays on the development of tourism territories and the relevance of institutional networks in developing institutional thickness and thus granting a higher support and engagement in tourism innovation processes.

Subsequently, the study presents several managerial implications. Tourism firms, destination management organisations and governance structures should acknowledge that there is a need to introduce strategies that allow: (i) increasing innovation performance at firm level; (ii) providing optimal conditions at regional level in order to create an innovation-friendly environment; (iii) promoting the creation of innovation networks comprising tourism firms and organisations; (iv) recognising knowledge-related processes as the basis of innovation and thus foster knowledge creation, sharing and collective learning within tourism destinations; (v) establishing solid links with internal and external knowledge producers , as the higher the diversity of links with distinct types of organisations, the higher the innovative potential of tourism firms and regions.

9.5 Limitations of the thesis and suggestions for future research

Despite the contributions made, this thesis presents some limitations that should be mentioned. The first approach made to this work and one of the initial objectives was to analyse the role of innovation in the development of tourism destinations. For that purpose three Portuguese regions were initially selected to conduct the empirical study: Douro, Aveiro and Algarve. The reason for this choice, already presented in chapter 5, is that they are at different stages of development. If the study had been applied in the three regions, more fruitful insights would have been drawn on the patterns of tourism innovation according to the development stage, as well as the role that innovation plays in the evolution of tourism destinations. Despite the fact that our results and conclusions were not affected and the objectives were not compromised, it is suggested that future research should include other regions at different phases of development.

Another suggestion is concerned with the social network analysis. In this thesis, this method is only applied to institutions. It would, however, be interesting to build sociograms of tourism firms as well. This is, nonetheless, a difficult endeavour, as most firms present constraints in specifically identifying other organisations with which they are engaged in collaborative arrangements to develop innovations, which is absolutely necessary in order to apply the social network analysis method.

Many of the limitations of the research concern the data collection instrument (survey) and the process of its application. First, the online survey appeared to be an adequate solution, considering that tourism firms are highly receptive to technologies: they all have web pages and e-mail accounts to contact with customers. However, the data collection via online survey was very time consuming and with low response rates. An effort has been made to overcome this drawback, namely the follow-up contacts and the phone survey. A high number of surveys was conducted by phone, which proved to be faster and more fruitful.

A second issue relates to the inability to identify the precise number of innovations developed by surveyed firms. The pilot survey included a question aimed at obtaining this information, but the respondents were unaware of it. Despite the effort made to overcome this limitation, the characterisation of innovation performance would be more complete if this would have been accomplished.

It should also be mentioned that, although the researcher limited the length of the survey, its dimension may have discouraged some people to respond.

Some suggestions for further research on this topic include interviews with tourism firms and institutions to deepen issues such as which specific innovative projects are on the basis of cooperation, to further identify determinants and obstacles to firms' innovation and to analyse the specific internal characteristics of tourism firms that lead to the development of regional innovation systems and to the increase in innovation performance.

References

Abernathy, W., & Clark, K. (1985). Innovation: Mapping the Winds of Creative Destruction. *Research Policy, 14*(1), 3-22.

Ackoff, R. L. (1981). *Creating the corporate future: plan or be planned for*. New York: John Wiley & Sons.

Acs, Z. J., & Audretsch, D. B. (1988). Innovation in Large and Small Firms: An Empirical Analysis. *American Economic Review, 78*(4), 678-690.

Adams, R., Bessant, J., & Phelps, R. (2006). Innovation management measurement: a review. *International Journal of Management Reviews, 8*(1), 21-47.

Afuah, A. (1998). *Innovation Management. Strategies, Implementations and Profits*. Oxford: Oxford University Press.

Agarwal, S. (1994). The resort cycle revisited: implications for resorts. In C. Cooper & A. Lockwood (Eds.), *Progress in Tourism, Recreation and Hospitality Management, Vol. 5*, pp. 194-207, Chichester: Wiley.

Agarwal, S. (1995). *The resort cycle and restructuring.* (Ph.D. Thesis), University of Surrey, Surrey, England.

Agarwal, S. (1997). The resort cycle and seaside tourism: an assessment of its applicability and validity. *Tourism Management, 18*(2), 65-73.

Ahuja, G. (2000). Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study. *Administrative Science Quarterly, 45*(3), 425-455.

AIP. (2010a). Carta Regional de Competitividade - Baixo Vouga Retrieved November 17th 2011, from http://www.aip.pt/irj/go/km/docs/site-manager/www_aip_pt/documentos/informacao_economica/cartas_regionais/informacao/Cartas%20Regionais-Regioes/7%20-%20Cartas_Regionais_BAIXO%20VOUGA.pdf

AIP. (2010b). Carta Regional de Competitividade - Douro/Trás-os-Montes Retrieved November 17th, 2011, from http://www.aip.pt/irj/go/km/docs/site-manager/www_aip_pt/documentos/informacao_economica/cartas_regionais/informacao/Cartas%20Regionais-Regioes/14%20-%20Cartas_Regionais_DOURO_ALTO%20TRAS-OS-MONTES.pdf

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal, 39*(5), 1154-1184.

Amin, A. (2000). *Organisational learning through communities of practice*. Paper presented at the Workshop on The Firm in Economic Geography, University of Portsmouth, UK, 9-11 March.

Amin, A. (2003). Industrial Districts. In E. Sheppard & T. J. Barnes (Eds.), *A Companion to Economic Geography* (pp. 149-168). Oxford: Blackwell Publishing.

Amin, A., & Thrift, N. (1994). Living in the Global. In A. Amin & N. Thrift (Eds.), *Globalization, Institutions, and Regional Development in Europe*. Oxford: Oxford University Press.

Amin, A., & Thrift, N. (1995). Globalization, Institutional Thickness and the Local Economy. In P. Healy, S. Cameron & A. Davoudi (Eds.), *Managing Cities: The New urban Context* Chichester: John Wiley.

Anderson, C. R., & Zeithaml, C. P. (1984). Stage of the product life cycle, business strategy and business performance. *Academy of Management Journal, 27*(1), 5-24.

Andersson, M., & Karlsson, C. (2004). Regional Innovation Systems in Small & Medium-Sized Regions. A critical review and assessment. *JIBS/CESIS Electronic Working Paper Series, No. 10*. Retrieved from http://www.infra.kth.se/cesis/documents/WP10.pdf

Andriotis, K. (2005). *The Tourism Life Cycle - An Overview Of The Cretan Case*. Paper presented at the Paper presented at the International Conference on Tourism Development and Planning, A.T.E.I. Patras, 11-12 June, 2005, Patra, Greece.

Archibugi, D., Howells, J., & Michie, J. (1999). Innovation Systems and Policy in a Global Economy. In D. Archibugi, J. Howells & J. Michie (Eds.), *Innovation Policy in a Global Economy* (pp. 1-16). Cambridge Cambridge University Press.

Arnold, E., & Kuhlmann, S. (2001). *RCN in the Norwegian Research and Innovation System*. Brighton: Technopolis.

Arrow, K. (1962). The economic implications of learning by doing. *Review of Economic Studies, 29*, 155-173.

Asheim, B. T. (1995). Industrial Districts as 'learning regions'. A condition for prosperity? *Paper No 199503, STEP Report series*.

Asheim, B. T. (2002). Temporary organizations and spatial embeddedness of learning and knowledge creation. *Geografiska Annaler, 84*(2), 111-124.

Asheim, B. T., & Coenen, L. (2004). *The role of Regional Innovation Systems in a globalising economy: comparing knowledge bases and institutional frameworks of Nordic clusters*. Paper presented at the DRUID Summer Conference 2004 on Industrial Dynamics, Innovation and Development, Elsinore, Denmark, June 14-16.

Asheim, B. T., & Coenen, L. (2005). Knowledge bases and regional innovation systems: Comparing Nordic clusters. *Research Policy, 34*(8), 1173-1190.

Asheim, B. T., Coenen, L. &, Svensson-Henning, M. (Eds.). (2003). *Nordic SMEs and Regional Innovation Systems - Final Report*: Department of Social and Economic Geography, Lund University.

Asheim, B. T., & Cooke, P. (1998). Localised Innovation Networks in a Global Economy: A Comparative Analysis of Endogenous and Exogenous Regional Development Approaches. In F. Engelstad, K. Ragnvlad & G. Brochman (Eds.), *Comparative Social Research, Vol. 17* (pp. 199-240). Stamford: JAI Press.

Asheim, B. T., & Isaksen, A. (1996). Location, Agglomeration and Innovation: Towards Regional Innovation Systems in Norway *STEP Report R-13*. Oslo.

Asheim, B. T., & Isaksen, A. (1997). Location, agglomeration and innovation: Towards regional innovation systems in Norway? *European Planning Studies, 5*(3), 299-331.

Asheim, B. T., & Isaksen, A. (2002). Regional innovation systems: the integration of local 'sticky' and global 'ubiquitous' knowledge. *Journal of Technology Transfer, 27*(1), 77-86.

Ashworth, G., & Tunbridge, J. (1990). *The Touristic-Historic City*. Londres: Belhaven Press.

Audi, R. (2003). *Epistemology: A Contemporary Introduction to the Theory of Knowledge*. New York: Routledge.

Audretsch, D. B. (1998). Agglomeration and the location of innovative activity. *Oxford Review of Economic Policy, 14*(2), 18-29.

Audretsch, D. B., & Feldman, M. P. (1996a). Innovative Clusters and the Industry Life Cycle. *Review of Industrial Organization, 11*(2), 253-273.

Audretsch, D. B., & Feldman, M. P. (1996b). R&D Spillovers and the Geography of Innovation and Production. *American Economic Review, 86*(3), 630-640.

Audretsch, D. B., & Feldman, M. P. (2004). Knowledge spillovers and the geography of innovation. In J. V. Henderson & J. F. Thisse (Eds.), *Handbook of Regional and Urban Economics* (Vol. 4, pp. 2713-2739): Elsevier.

Aydalot, P. (1986). *Milieux innovateurs en Europe*. Paris: GREMI.

Baggio, R. (2008). *Network analysis of a tourism destination.* (Ph.D. in Tourism), University of Queensland, Queensland, Australia.

Baggio, R., & Cooper, C. (2008). *Knowledge management and transfer in tourism: an Italian case*. Paper presented at the paper presented at IASK Advances in Tourism Research (ATR 2008), Aveiro, Portugal, 26-28 May.

Baggio, R., & Cooper, C. (2010). Knowledge transfer in a tourism destination: the effects of a network structure. *The Service Industries Journal, 30*(8).

Baggio, R., Scott, N., & Cooper, C. (2002). Network Science: a Review focused on Tourism. *Annals of Tourism Research, 37*(3), 802–827.

Baggio, R., Scott, N., & Cooper, C. (2010). Improving tourism destination governance: a complexity science approach. *Tourism Review, 65*(4), 51-60.

Bagnasco, A. (1977). *Tre Italia: La Problematica Territoriale dello Sviluppo Economico Italiano*. Bologna: Il Mulino.

Barabasi, A.-L. (2002). *Linked: The New Science of Networks*. Cambridge: Perseus.

Barabási, A. L., & Albert, R. (1999). Emergence of scaling in random network. *Science, 286*, 509-512.

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision, 47* (8), 1323 - 1339.

Barrett, J. A. (1958). *The Seaside Resort Towns of England and Wales.* (Unpublished PhD Thesis), University of London, London.

Barron, L. (2006). Paradigm. In V. Jupp (Ed.), *The Sage Dictionary of Social Research Methods* (pp. 212-213). London: SAGE Publications.

Baruch, Y., & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human Relations, 61*(8), 1139-1160.

Bathelt, H. Malmberg, A., & Maskell, P. (2004). Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography, 28*(1), 31-56.

Baum, J. A. C., Shipilov, A. V., & Rowley, T. J. (2003). Where do small worlds come from? *Industrial and Corporate Change, 12*(4), 697-725.

Baum, T. (1998). Taking the Exit Route: Extending the Tourism Area Life Cycle Model. *Current Issues in Tourism, 1*(2), 167-175.

Becattini, G. (1990). The Marshallian Industrial District as a socio-economic notion. In F. Pyke, G. Becatini & W. Sengenberger (Eds.), *Industrial Districts and Inter-firm co-operation in Italy* (pp. 18-33). Geneva: International Institute for Labour Studies.

Becattini, G. (2002). Industrial Sectors and Industrial Districts: Tools for Industrial Analysis. *European Planning Studies, 10*(4), 483 - 493.

Beesley, L. (2005). The management of emotion in collaborative tourism research settings. *Tourism Management, 26*, 261-275.

Bellandi, M. (1996). Innovation and change in the Marshallian Industrial District. *European Planning Studies, 4*(3), 357.

Bellandi, M., & Caloffi, A. (2010). An Analysis of Regional Policies Promoting Networks for Innovation. *European Planning Studies, 18*(1), 67 - 82.

Berenson, C. (1967). The Purchasing Executive's Adaptation To The Product Life Cycle. *Journal of Purchasing, 3*(2), 62-68.

Bergek, A., Jacobsson, S., Carlsson, B., Lindmark, S., & Rickne, A. (2008). Analyzing the functional dynamics of technological innovation systems: A scheme of analysis. *Research Policy, 37*(3), 407-429.

Bergin-Seers, S., Breen, J., & Frew, E. (2008). The determinants and barriers affecting innovation management in SMTEs in the tourist park sector. *Tourism Recreation Research, 33*(3), 245-253.

Berry, T. (2001). *An Application of Butler's Tourism Area Life Cycle to the Cairns Region, Australia, 1876 - 1998.* (Ph.D. Thesis), James Cook University of North Queensland, Queensland.

Bieger, T., & Weinert, R. (2006). On the nature of innovative organizations in tourism: Structure, process and results. In B. Walder, K. Weiermair & A. Sancho-Perez (Eds.), *Innovation and product development in tourism* (pp. 88–102). Berlin: Erich Schmidt Verlag.

Bonacich, P. (1987). Power and centrality: a family of measures. *The American Journal of Sociology, 92*, 1170-1182.

Bonetti, E., Petrillo, C. S., & Simoni, M. (2006). Tourism System Dynamics: A Multi-level Destination Approach. In L. Lazzeretti & C. S. Petrillo (Eds.), *Tourism Local Systems and Networking* (pp. 111-133). Amsterdam: Elsevier.

Borgatti, S. J., Jones, C., & Everett, M. G. (1998). Network measures of social capital. *Connections, 21*(2), 27-36.

Borgatti, S. P. (1997). Structural Holes: Unpacking Burt's Redundancy Measures. *Connections, 20*(1), 35-38.

Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *Ucinet for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.

Borgatti, S. P., & Foster, P. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management, 29*(6), 991-1013.

Borgatti, S. P., Mehra, A., Brass, D., & Labianca, G. (2009). Network Analysis in the Social Sciences. *Science, 323*(5916), 892 - 895.

Borrás, B. C. (2004). System of Innovation: Theory and the European Union. *Science & Public Policy, 31*(6), 425-433.

Boschma, R. A. (2005). Proximity and innovation: A critical assessment. *Regional Studies, 39*(1), 61-74.

Bouba-Olga, O., & Grossetti, M. (2005). Une (re)définition des notions de proximité. Retrieved from http://sceco.univ-poitiers.fr/recherpubli/doctravail/T2005-04.pdf

Boyd, S. W. (2006). The TALC Model and its Application to National Parks: A Canadian Example. In R. Butler (Ed.), *The Tourism Area Life Cycle - Vol.1. Applications and Modifications* (pp. 119-138). Clevedon: Channel View Publications.

Braczyk, H. J., Cooke, P., & Heidenreich, M. (Eds.). (1998). *Regional Innovation Systems: The role of governance in a globalized world*. London: UCL Press.

Bramwell, B. (2006). Actors, Networks and Tourism Policies. In D. Buhalis & C. Costa (Eds.), *Tourism Management Dynamics - Trends, Management and Tools*. London: Elsevier.

Brandão, F. (2007). *Os Observatórios do Turismo como meios de apoio à gestão e à competitividade. Conceptualização de um modelo para a Região de Aveiro.* (Tese de Mestrado), Universidade de Aveiro.

Brandão, F., & Costa, C. (2012). Regional Innovation Systems and Tourism: a Conceptual Approach. *Revista Turismo e Desenvolvimento, 17/18*(2), 647-660.

Brandão, F., & Costa, C. (2014). Inovação em Turismo: Uma abordagem sistémica e territorial. In C. Costa, F. Brandão, R. Costa & Z. Breda (Eds.), *Produtos e Competitividade do Turismo na Lusofonia - Volume II* (pp. 69-89). Lisboa: Escolar Editora.

Breda, Z., Costa, R., & Costa, C. (2005). Clustering and networking the tourism development process: a market driven approach for a small backwards tourist region located in central Portugal (Caramulo). In C. S. Petrillo & J. Swarbrook (Eds.), *Atlas Annual Conference: Networking and Partnerships in Destination Development and Management*. Naples: Atlas.

Breda, Z., Costa, R., & Costa, C. (2006). Do clusters and networks make small places beautiful? The case of Caramulo (Portugal). In L. Lazzeretti & C. S. Petrillo (Eds.), *Tourism Local Systems and Networking* (pp. 67-82). London: Elsevier.

Breschi, S., & Lissoni, F. (2000). *Knowledge Spillovers and Local Innovation Systems: A Critical Survey*. Paper presented at the paper presented at 40th European Regional Science Association Conference, Barcelona, 29 August - 2 September.

Breschi, S., & Malerba, F. (1997). Sectoral Systems of Innovation: Technological Regimes, Schumpeterian Dynamics and Spatial Boundaries. In C. Edquist (Ed.), *Systems of Innovation* (pp. 130-157). London: Pinter.

Brohman, J. (1996). *Popular Development*: Wiley-Blackwell.

Brooker, E., & Burgess, J. (2008). Marketing destination Niagara effectively through the tourism life cycle. *International Journal of Contemporary Hospitality Management, 20* (3), 278 - 292.

Brougham, J. E., & Butler, R. (1972). *The applicability of the asymptotic curve to the forecasting of tourism development*. Paper presented at the Paper presented to the Research Workshop, Travel Research Association 4th Annual Conference, Quebec, July 1972.

Bryman, A. (1984). The Debate about Quantitative and Qualitative Research: A Question of Method or Epistemology? *The British Journal of Sociology, 35*(1), 75-92.

Buhalis, D. (1999). Tourism on the Greek Islands: Issues of Peripherality, Competitiveness and Development. *International Journal of Tourism Research, 1*, 341-358.

Buhalis, D. (2000). Marketing the competitive destinations of the future. *Tourism Management, 21*(1), 97-116.

Buhalis, D., & Costa, C. (2014). Estratégias de e-tourism. In C. Costa, F. Brandão, R. Costa & Z. Breda (Eds.), *Produtos e Competitividade do Turismo na Lusofonia* (pp. 51-68). Lisboa: Escolar Editora.

Buhalis, D., & Costa, C. M. M. (Eds.). (2006a). Tourism Management Dynamics: Trends, Management and Tools. London: Elsevier.

Buhalis, D., & Costa, C. M. M. (Eds.). (2006b). Tourism Business Frontiers: Consumers, Products and Industry. London: Elsevier.

Bullock, A., & Trembley, S. (Eds.). (1999). *The Fontana Dictionary of Modern Thought*. London: Harper-Collins.

Bunnell, T. G., & Coe, N. M. (2001). Spaces and scales of innovation. *Progress in Human Geography, 25*(4), 569-589.

Burt, R. S. (1992). Structural Holes: The Social Structure of Competition. Cambridge and London: Harvard University Press.

Burt, R. S. (1997). The contingent value of social capital. *Administrative Science Quarterly, 42*(2), 339-365.

Burt, R. S. (2001). Structural Holes versus Network Closure as Social Capital. In N. Lin, K. S. Cook & R. S. Burt (Eds.), *Social Capital: Theory and Research* (pp. 31-56). New York: Aldine de Gruyter.

Burt, R. S. (2004). Structural Holes and Good Ideas. *American Journal of Sociology, 110*(2), 349-399.

Burton, R. (1995). *Travel Geography* (2nd Edition ed.). London: Pitman Publishing.

Butler, R. (1980). The concept of a tourist area cycle of evolution: Implications for management of resources. *The Canadian Geographer, 24*(1), 5-12.

Butler, R. (2006). The Origins of the Tourism Area Life Cycle. In R. Butler (Ed.), *The Tourism Area Life Cycle - Vol.1. Applications and Modifications*. Clevedon: Channel View Publications.

Cairncross, F. (1997). *The Death of Distance*. London: Orion Business Books.

Camagni, R. (Ed.). (1991). *Innovation Networks: Spatial Perspectives*. London and New York: GREMI/Belhaven Press.

Capello, R. (1999). Spatial transfer of knowledge in high technology milieux: learning versus collective learning processes. *Regional Studies, 33*(4), 353-365.

Cappellin, R. (2007). The Territorial Dimension of the Knowledge Economy: Collective Learning, Spatial Changes, and Regional and Urban Policies. *American Behavioral Scientist, 50*(7), 897-921.

Carlsson, B. (Ed.). (1995). *Technological systems and economic performance: the case of factory automation*. Dordrecht: Kluger.

Carlsson, B., Jacobsson, S., Holmén, M., & Rickne, A. (2002). Innovation systems: analytical and methodological issues. *Research Policy, 31*, 233-245.

Carlsson, B., & Stankiewicz, R. (1991). On the nature, function, and composition of technological systems. *Journal of Evolutionary Economics, 1*, 93-118.

Carson, D., & Macbeth, J. (Eds.). (2005). *Regional Tourism Cases: Innovation in Regional Tourism*: Cooperative Research Centre for Sustainable Tourism.

Castells, M. (1996). *The Rise of the Network Society*. Oxford: Blackwell Publishers.

Castells, M. (2010). *The rise of the network society* (2nd ed.). Chichester, West Sussex ; Malden, MA: Wiley-Blackwell.

Comissão de Coordenação e Desenvolviento da Região Norte - CCDR-N. (2008). *Plano Desenvolvimento Turístico do Vale do Douro 2007-2013* Porto: CCDR-N.

Comissão de Coordenação e Desenvolviento da Região Norte - CCDR-N. (2012). Structure of Mission for the Demarcated Region of Douro. Retrieved June 14th 2012, from http://www.ccdr-n.pt/pt/portugal-north-region/struct-mission-for-douro/

Chaminade, C., & Edquist, C. (2005). From theory to practice: the use of systems of innovation approach in innovation policy. *CIRCLE Electronic Working Paper Series.* Retrieved from http://www.obs.ee/~siim/seminars/chaminade+edquist2005.pdf

Chaminade, C., & Roberts, H. (2002). *Social Capital as a Mechanism: Connecting Knowledge Within and Across Firms*. Paper presented at the Third European Conference on Organizational Knowledge, Learning and Capabilities - OKLC, Athens, Greece, April 2002.

Chandy, R. K., & Tellis, G. J. (1998). Organizing for radical product innovation: The overlooked role of willingness to cannibalise. *Journal of Marketing Research, 35* (4), 474-487.

Chang, Y.-C., & Chen, M.-H. (2004). Comparing approaches to systems of innovation: the knowledge perspective. *Technology in Society, 26*(1), 17-37.

Chesbrough, H. W., & Teece, D. J. (1996). When is virtual virtuous? Organizing for innovation. *Harvard Business Review, 74*(1), 65-73.

Chetty, S., & Agndal, H. (2008). Role of Inter-organizational Networks and Interpersonal Networks in an Industrial District. *Regional Studies, 42*(2), 175-187.

Child, J., Faulkner, D., & Tallman, S. B. (2005). *Cooperative Strategy: Managing Alliances, Networks and Joint Ventures*. Oxford: Oxford University Press.

Christaller, W. (1963). Some Considerations of Tourism Location in Europe: The Peripheral Regions - Under-Developed Countries - Recreation Areas. *Papers in Regional Science, 12*(1), 95-105.

Clar, G., Sautter, B., & Hafner-Zimmermann, S. (2008). Strategic Cluster Development: Applying Strategic Policy Intelligence to create a Joint Research Agenda. *Background paper for the CReATE project*. Retrieved from http://www.lets-

create.eu/fileadmin/_create/downloads/del-1-2_cluster-background-paper_revised_final.pdf

Coccia, M. (2006). Classifications of Innovations: Survey and Future Directions. *WORKING PAPER CERIS-CNR, Nº2/2006*.

Coffey, W. J., & Polése, M. (1985). Local development: conceptual bases and policy implications. *Regional Studies, 19*(2), 85-93.

Cohen, E. (1972). Toward a Sociology of International Tourism. *Social Research, 39*(1), 164-182.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly, 35*(1), 128-152.

Coleman, J. (1988). Social Capital in the creation of Human Capital. *American Journal of Sociology, 94*, 95-121.

Coleman, J. (1990). *Foundations of Social Theory*. Cambridge: Harvard University Press.

Coleman, J. (1994). A Rational Choice Perspective on Economic Sociology. In N. Smelser & R. Swedberg (Eds.), *The Handbook of Economic Sociology*. New York: Princeton University Press.

Comte, A. (1876). *The course of positive philosophy*. London: George Bell and Sons.

Considine, M., Lewis, J. M., & Alexander, D. (2009). *Networks, Innovation and Public Policy. Politicians, Bureaucrats and the Pathways to Change inside Government*. London: Palgrave Macmillan.

Cooke, P. (1996). The New Wave of Regional Innovation Networks: Analysis, Characteristics and Strategy. *Small Business Economics, 8*(2), 159-171.

Cooke, P. (1998). Introduction: Origins of the Concept. In H. J. Braczyk, P. Cooke & M. Heidenreich (Eds.), *Regional Innovation Systems*. London: UCL Press.

Cooke, P. (2001). Regional Innovation Systems, Clusters, and the Knowledge Economy. *Industrial & Corporate Change, 10*(4), 945-974.

Cooke, P. (2007). Regional innovation systems, asymmetric knowledge and the legacies of learning. In R. Rutten & F. Boekema (Eds.), *The Learning Region: Foundations, State of the Art, Future* (pp. 184-205). Cheltenham and Northampton: Edward Elgar.

Cooke, P., Gomez Uranga, M., & Etxebarria, G. (1997). Regional innovation systems: Institutional and organisational dimensions. *Research Policy, 26*(4-5), 475-491.

Cooke, P., Gomez Uranga, M., & Etxebarria, G. (1998). Regional systems of innovation: an evolutionary perspective. *Environment and Planning A, 30*, 1563-1584.

Cooke, P., & Memedovic, O. (2003). *Strategies for Regional Innovation Systems: Learning Transfer and Applications*. Vienna: United Nations Industrial Development Organization.

Cooke, P., & Morgan, K. (1998). *The associational economy: firms, regions, and innovation*. Oxford: Oxford University Press.

Cooke, P., & Schienstock, G. (2000). Structural Competitiveness and Learning Regions. *Enterprise & Innovation Management Studies, 1*(3), 265-280.

Coombs, R., & Miles, I. D. (2000). Innovation, measurement and services: the new problematique. In J. S. Metcalfe & I. D. Miles (Eds.), *Innovation Systems in the Service Sectors. Measurement and Case Study Analysis* (pp. 85-104). London: Kluwer.

Cooper, C. (1990). Resorts in decline - the management response. *Tourism Management, 11*(1), 63-67.

Cooper, C. (1992). The Lifecycle Concept and Tourism. In P. Johnson & B. Thomas (Eds.), *Choice and Demand in Tourism* (pp. 145-160). London: Mansell.

Cooper, C. (1994). The Destination Life Cycle: An Update. In A. Seaton, C. Jenkins, R. Wood, P. Dieke, M. Bennett & R. Smith (Eds.), *Tourism: The State of the Art* (pp. 340–346). Chichester Wiley.

Cooper, C. (2006). Knowledge management and tourism. *Annals of Tourism Research, 33*(1), 47-64.

Cooper, C., & Jackson, S. (1989). Destination life cycle: The isle of man case study. *Annals of Tourism Research, 16*(3), 377-398.

Cooper, C., Jago, L., Carlsen, J., & Ruhanen, L. (2006). *Identification of Inhibitors and Facilitators to Research Adoption in the Tourism Sector*: CRC for Sustainable Tourism.

Cooper, J. R. (1998). A multidimensional approach to the adoption of innovation. *Management Decision, 36*(8), 493-502.

Corak, S. (2006). The Modification of the Tourism Area Life Cycle Model for (Re)inventing a Destination: the Case of Opatija Riviera, Croatia. In R. Butler (Ed.), *The Tourism Area Life Cycle - Vol.1. Applications and Modifications* (pp. 271-286). Clevedon: Channel View Publications.

Corbetta, P. (2003). *Social Research: Theory, Methods and Techniques*. London: Sage.

Costa, C. (1996). *Towards the Improvement of the Efficiency and Effectiveness of Tourism Planning and Development at the Regional Level: Planning, Organisations and Networks. The Case of Portugal.* (Ph.D. Thesis), University of Surrey, England.

Costa, C., & Brandão, F. (2011). *Tourism Innovation through effective public participation: a sustainable approach.* Paper presented at the Proceedings of the International Tourism Sustainability Conference 2011 'Embracing Social and Environmental Change: The Influence and Role of Tourism', University of Technology of Mauritius, 21-24 September.

Costa, C., Breda, Z., Costa, R., & Miguéns, J. (2008). The Benefits of Networks for Small and Medium Sized Tourism Enterprises. In N. Scott, R. Baggio & C. Cooper (Eds.), *Network*

Analysis and Tourism: From Theory to Practice (pp. 96-114). Clevedon: Channel View Publications.

Costa, C. M. M. (2001). *O papel e a posição do sector privado na construção de uma nova política para o turismo*. In AEP (Ed.) *Novas Estratégias para o Turismo*, Porto:AEP.

Crevoisier, O., & Maillat, D. (1991). Milieu, industrial organisation and territorial production system: towards a new theory of spatial development. In R. Camagni (Ed.), *Innovation Networks: Spatial Perspectives*. London and New York: GREMI/Belhaven Press.

Crotty, M. (1998). *The foundations of social research: meaning and perspective in the research process*. London: SAGE.

Dahl, M. S. (2003). *Knowledge diffusion and regional clusters: lessons from the Danish ICT industry.* (PhD Thesis), Aalborg University.

Damanpour, F. (1996). Organizational complexity and innovation: developing and testing multiple contingency models. *Management Science, 42* (5), 693-716.

Dancy, J. (2001). *Introduction to contemporary epistemology*. Oxford: Blackwell Publishers.

David, P. A., & Foray, D. (1994). *Accessing and expanding the science and technology knowledge base: A conceptual framework for comparing national profiles in systems of learning and innovation*. Paris: OECD.

De Albuquerque, K., & McElroy, J. L. (1992). Caribbean small-island tourism styles and sustainable strategies. *Environmental Management, 16*(5), 619-632.

de Jong, J. P. J., & Marsili, O. (2006). The fruit flies of innovations: a taxonomy of innovative small firms. *Research Policy, 35*(2), 213-229.

Dean, J. (1950). Pricing Policies for New Products. *Harvard Business Review, 28*(6), 45-53.

Debbage, K. G. (1990). Oligopoly and the resort cycle in the Bahamas. *Annals of Tourism Research, 17*(4), 513-527.

Decelle, X. (2006). *A Conceptual and Dynamic Approach to Innovation in Tourism*. Paper presented at the Proceedings of the OECD Conference on Innovation and Growth in Tourism, Lugano, Switzerland, 18-19 September 2003. http://www.oecd.org/dataoecd/55/28/34267921.pdf

Degenne, A., & Forse, M. (1999). *Introducing Social Networks*. London: Sage.

Dei Ottati, G. (1994). Cooperation and competition in the industrial district as an organization model. *European Planning Studies, 2*(4), 463–483.

Dei Ottati, G. (2002). Social concertation and local development: The case of industrial districts. *European Planning Studies, 10*(4), 449-466.

den Hertog, P. (2000). Knowledge Intensive Business Services as Co-Producers of Innovation. *International Journal of Innovation Management, 4*(4), 491-528.

Dencker, A. (1998). *Métodos e Técnicas de Pesquisa em Turismo*. São Paulo: Editora Futura.

Deshaies, B. (1997). *Metodologia de Investigação em Ciências Humanas*. Lisboa: Instituto Piaget.

Diez, J. D. (2000). Innovative networks in manufacturing: some empirical evidence from the metropolitan area of Barcelona. *Technovatio, 20*, 139-150.

Dillman, D. A. (2000). *Mail and Internet Surveys: The Tailored Design Method*. New York: Wiley.

DiMaggio, P. J., & Powell, W. (1983). The Iron Cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*, 147-160.

Doloreux, D. (2003). Regional innovation systems in the periphery: the case of the Beauce in Québec (Canada). *International Journal of Innovation Management, 7*(1), 67-94.

Doloreux, D. (2004). Regional Innovation Systems in Canada: A Comparative Study. *Regional Studies, 38*(5), 479 - 492.

Doloreux, D., & Parto, S. (2005). Regional innovation systems: Current discourse and unresolved issues. *Technology in Society, 27*(2), 133-153.

Dong, E., Morais, D., & Dowler, L. (2004). Ethnic Tourism Development in Yunnan, China: Revisiting Butler's Tourist Area Lifecycle. In J. Murdy (Ed.), *Proceedings of the 2003 Northeastern Recreation Research Symposium* (pp. 164-169). Delaware: U.S. Department of Agriculture, Forest Service, Northeastern Research Station.

Dosi, G. (1988). Sources, Procedures, and Microeconomic Effects of Innovation. *Journal of Economic Literature, 26*(3), 1120-1171.

Doxey, G. V. (1975). *A Causation Theory of Visitor-Resident Irritants; Methodology and Research Inferences*. Paper presented at the Proceedings of the Travel and Research Association, 6th Annual Conference, San Diego, California.

Doyle, P. (1976). The realities of the product life cycle. *Quarterly Review of Marketing, Summer*, 1-6.

Dredge, D. (2005). Networks and Innovation in Lake Macquarie. In D. Carson & J. Macbeth (Eds.), *Regional Tourism Cases: Innovation in Regional Tourism* (pp. 61-68). Gold Coast Sustainable Tourism Cooperative Research Center.

Dredge, D. (2006). Policy networks and the local organisation of tourism. *Tourism Management, 27*(2), 269-280.

Drejer, I. (2004). Identifying innovation in surveys of services: a Schumpeterian perspective. *Research Policy, 33*(3), 551-562.

Droege, H., Hildebrand, D., & Forcada, M. A. H. (2009). Innovation in services: present findings, and future pathways. *Journal of Service Management, 20*(2), 131-155.

Drucker, P. (1985). *Innovation and Entrepreneurship: Practice and Principles*. New York: Harper & Row.

Drucker, P. (1993). *Post-capitalist society*. Oxford: Butterworth-Heinemann

Drucker, P. (1998). *Peter Drucker on the profession of management*. Boston: Harvard Business Press.

Drucker, P. (1999). *Management Challenges for the 21st Century*. Oxford: Butterworth-Heinemann.

Durkheim, E. (1895). *Les règles de la méthode sociologique*. Paris: Alcan.

Easterby-Smith, M., Thorpe, R., & Lowe, A. (1991). *Management Research: An Introduction*. London: Sage.

Edquist, C. (1997). *Systems of Innovation: Technologies, Institutions and Organizations*. London: Pinter.

Edquist, C. (2001). *The Systems of Innovation Approach and Innovation Policy: An Account of the State of the Art*. Paper presented at the Lead paper presented at the DRUID Conference on "National Systems of Innovation, Institutions and Public Policies", Aalborg, 12-15 June.

Edquist, C. (2006). Systems of Innovation: Perspectives and Challenges. In J. Fagerberg, D. C. Mowery & R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 181-208). Oxford: Oxford University Press.

Edquist, C., & Johnson, B. (1997). Institutions and organisations in systems of innovation. In C. Edquist (Ed.), *Systems of Innovation: Technologies, Institutions and Organizations* (pp. 41-63). London: Pinter.

Enright, M. J. (1996). Regional Clusters and Economic Development: A Research Agenda. In U. Staber, N. Schaefer & B. Sharma (Eds.), *Business Networks: Prospects for Regional Development* (pp. 190-214). New York: De Gruyter.

Enright, M. J. (2001). *Regional clusters: what we know and what we should know*. Paper presented at the Paper presented at the Kiel Institute International Workshop on Innovation Clusters and Interregional Competition, 12-13 November.

Enright, M. J. (2003). Regional Clusters and Firm Strategy. In A. D. Chandler, P. Hagström & Ö. Sölvell (Eds.), *The Dynamic Firm: The Role of Technology, Strategy, Organization, and Regions*. Oxford: Oxford University Press.

Erdos, P., & Renyi, A. (1959). On random networks. *Publicationes Mathematicae, 6*, 290-297.

Ettlie, J. E., William, P. B., & O'Keefe, R. D. (1984). Organisational strategy and structural differences for radical vs. incremental innovations. *Management Science, 30*, 682-695.

Etzkowitz, H. (2003). Innovation in innovation: the triple helix of university-industry-government relations. *Social Science Information, 42*(3), 293-337.

European Cluster Observatory. (2008). Case studies of clustering efforts in Europe: Analysis of their potential for promoting innovation and competitiveness. *Europe INNOVA Cluster Mapping Project*. Retrieved from http://www.clusterobservatory.eu/library/100132.pdf

European Commission. (2008). *The concept of Clusters and Cluster Policies and their role for Competitiveness and Innovation: Main statistical results and lessons learned*. Luxembourg: Office for Official Publications of the European Communities.

Evangelista, R., Iammarino, S., Mastrostefano, V., & Silvani, A. (2002). Looking for Regional Systems of Innovation: Evidence from the Italian Innovation Survey. *Regional Studies, 36*(2), 173-186.

Evangelista, R., & Savona, M. (1998). *Patterns of innovation in services: the results of the Italian Innovation Survey*. Paper presented at the Paper presented on the 7th Annual RESER Conference, Berlin.

Evans, N., Campbell, D., & Stonehouse, G. (2003). *Strategic Management for Travel and Tourism*. Oxford and Burlington: Butterworth-Heinemann.

Fagerberg, J. (2006). Innovation. A Guide to the Literature. In J. Fagerberg, D. C. Mowery & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 1-26). Oxford: Oxford University Press.

Faulkner, B. & Tideswell, C. (2005). Rejuvenating a maturing tourist destination: the case of the Gold Coast, Australia. In R. Butler (Ed.), *The Tourism Area Life Cycle: applications and modifications, Vol. 1* (pp. 306-337). Clevedon: Channel View.

Feldman, M. P. (1994). *The Geography of Innovation*. Dordrecht: Kluwer Academic Publishers.

Feldman, M. P. (1999). The new economics of innovation, spillovers and agglomeration: a review of empirical studies. *Economics of Innovation and New Technology, 8*(1), 5-25.

Feldman, M. P. (2000). Location and innovation: the new economic geography of innovation, spillovers, and agglomeration. In G. L. Clark, M. P. Feldman & M. Gertler (Eds.), *The Oxford Handbook of Economic Geography* (pp. 373-394). Oxford: Oxford University Press.

Feldman, M. P. (2003). The locational dynamics of US biotechnology industry: knowledge externalities an the anchor hypothesis. *Industry and Innovation, 10*(3), 311-328.

Ffowes Williams, I. (1996). Hard and Soft Networks: helping firms cooperate for export growth *New Zealand Strategic Management, 2*(2), 30-36.

Flores, M. (2006). O ciclo de vida do destino turístico: O estudo de caso do balneário de Búzios. In C. L. Carvalho & L. G. M. Barbosa (Eds.), *Discussão de propostas para o turismo no Brasil: Observatório de inovação do turismo* (pp. 156-195). Rio de Janeiro: Senac Nacional.

Florida, R. (1995). Toward the Learning Region. *Futures, 27*(5), 527-536.

Freel, M. (2000). External linkages and product innovation in small manufacturing firms. *Entrepreneurship and Regional Development 12*, 245-266.

Freel, M. S. (2003). Sectoral patterns of small firm innovation, networking and proximity. *Research Policy, 32*(5), 751-770.

Freeman, C. (1982). *The Economics of Industrial Innovation*. Cambridge, MA.: The MIT Press.

Freeman, C. (1987). *Technology and economic performance: lessons from Japan*. London: Pinter.

Freeman, C., Clark, J., & Soete, L. (1982). *Unemployment and Technical Innovation: A Study of Long Waves and Economic Development*. London: Frances Printer.

Freeman, C., & Perez, C. (1988). Structural Crises of Adjustment, Business Cycles and Investment Behavior. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg & L. Soete (Eds.), *Technical Change and Economic Theory*. London: Pinter.

Freeman, L. C. (1979). Centrality in Social Networks: Conceptual Clarification. *Social Networks, 1*, 215-239.

Freeman, L. C. (2004). *The Development of Social Network Analysis. A Study on the Sociology of Science*. Vancouver: Empirical Press.

Frohman, A. L., & Bitondo, D. (1981). Coordinating business strategy and technical planning. *Long Range Planning, 14*(6), 58-67.

Fromhold-Eisebith, M. (2004). Innovative milieu and social capital - Complementary or redundant concepts of collaboration-based regional development? *European Planning Studies, 12*(6), 747-765.

Fujita, M., & Thisse, J. F. (1996). Economics of Agglomeration. *Journal of the Japanese and International Economie, 10*, 339–378.

Gadrey, J., Gallouj, F., Lhuillert, S., & Weinstein, O. (1994). *Innovation et R-D dans les services: des modalités originales, qui peuvent enrichir les conceptions industrielles*. Paper presented at the Proceedings of the 3rd International Research Seminar in Service Management: "Management of Services: a Multidisciplinary Approach", Aix-en-Provence.

Galbraith, J. R. (1982). Designing the Innovating Organization. *Organizational Dynamics, 10*(3), 4-25.

Galli, R., & Teubal, M. (1997). Paradigmatic shifts in National Innovation Systems. In C. Edquist (Ed.), *Systems of Innovation: Technologies, Institutions and Organisations* (pp. 342-370). London: Pinter.

Gallouj, F. (1998). Innovating in reverse: services and the reverse product cycle. *European Journal of Innovation Management, 1*(3), 123-138.

Gallouj, F., & Weinstein, O. (1997). Innovation in services. *Research Policy, 26*(4-5), 537-556.

Gay, B., & Dousset, B. (2005). Innovation and network structural dynamics: Study of the alliance network of a major sector of the biotechnology industry. *Research Policy, 34*, 1457-1475.

Gertler, M. (1997). The invention of regional culture. In R. Lee & J. Wills (Eds.), *Geographies of Economies* (pp. 47-58). London: Edward Arnold.

Gertler, M. (2003). Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). *Journal of Economic Geography, 3*(1), 75-99. doi: 10.1093/jeg/3.1.75

Gertler, M., Wolfe , D., & Garkut, D. (2001). No place like home? The embeddedness of innovation in a regional economy. *Review of International Political Economy, 7*(4), 688-718.

Getz, D. (1992). Tourism planning and destination life cycle. *Annals of Tourism Research, 19*(4), 752-770.

Gibson, L., Lynch, P., & Morrison, A. (2005). The local destination tourism network: Development issues. *Tourism and Hospitality Planning and Development, 2*(2), 87-99.

Giddens, A. (1993). *New Rules of Sociological Method: A Positive Critique of Interpretative Sociologies*. Stanford: Stanford University Press.

Gilbert, E. W. (1939). The growth of inland and seaside health resorts in England. *Scottish Geographical Magazine, 55*(1), 16-35.

Gilbert, E. W. (1949). The growth of Brighton. *Geographical Journal, 114*, 30-52.

Gilbert, E. W. (1954). *Brighton - Old ocean's bauble*. London: Methuen.

Giuliani, E., & Pietrobelli, C. (2011). *Social Network Analysis Methodologies for the Evaluation of Cluster Development Programs*. TECHNICAL NOTES No. IDB-TN-317: Inter-American Development Bank.

Glaeser, E. L., Kallal, H. D., Scheinkman, J. A., & Shleifer, A. (1992). Growth in Cities. *The Journal of Political Economy, 100*(6), 1126-1152.

Godkin, E. L. (2004). *Reflections and Comments 1865 to 1895*: Kessinger Publishing.

Goeldner, C. R., & Ritchie, J. R. B. (2002). *Tourism: Principles, Practices, Philosophies* (9th ed.). New York: John Wiley & Sons Inc.

Goldman, A. (1986). *Epistemology and cognition*. Cambridge: Harvard University Press.

Gopalakrishnan, S., Bierly, P., & Kessler, E. H. (1999). A re-examination of product and process innovations using a knowledge-based view. *The Journal of High Technology Management Research, 10*(1), 147-166.

Gordon, I., & Goodall, B. (1992). Resort Cycles and Development Processes. *Built Environment, 18*(1), 41-56.

Gordon, I. R., & McCann, P. (2000). Industrial Clusters: Complexes, Agglomeration and/or Social Networks? *Urban Studies, 37*(3), 513-532.

Gormsen, E. (1981). The spatio-temporal development of international tourism: A center-periphery model *La Consommation d'Espace par le Tourism et sa Preservation* (pp. 150-170). Aix la Provence: Centre d'études touristiques.

Gort, M., & Klepper, S. (1982). Time paths in the diffusion of product innovations. *Economic Journal, 92*(367), 630-653.

Gabinete de Planeamento, Estratégia, Avaliação e Relações Internacionais - GPEARI. (2010). *Sumários Estatísticos CIS 2008: Inquérito Comunitário à Inovação [Statistical Summaries CIS 2008: Community Innovation Survey]*. Lisboa: GPEARI.

Gabinete de Planeamento, Estratégia, Avaliação e Relações Internacionais - GPEARI. (2012). *Sumários Estatísticos CIS 2010: Inquérito Comunitário à Inovação [Statistical Summaries CIS 2008: Community Innovation Survey]*. Lisboa: GPEARI.

Grabher, G. (1993). The weakness of stronf ties: the lock-in effect of regional development in Ruhr area. In G. Grabher (Ed.), *The Embedded Firm: On the Socioeconomics of Industrial Networks* (pp. 255-277). London: Routledge.

Grabher, G., & Powell, W. W. (2004). Introduction. In G. Grabher & W. W. Powell (Eds.), *Networks (Vol. 1)* (pp. xi-xxxi). Cheltennham: Edward Elgar Publishing.

Granovetter, M. (1973). The Strength of Weak Ties. *American Journal of Sociology, 78* (6), 1360-1380.

Granovetter, M. (1983). The Strength of Weak Ties: a Network Theory Revisited. *Sociological Theory, 1*, 201-233.

Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology, 91* (3), 481-510.

Grant, M. (2004). Innovation in Tourism Planning Processes: Action Learning to Support a Coalition of Stakeholders for Sustainability. *Tourism and Hospitality Planning & Development, 1*(3), 219–237.

Gray, D. E. (2004). *Doing Research in the Real World*. London: Sage.

Gregersen, B., & Johnson, B. (1997). Learning Economies, Innovation Systems and European Integration. *Regional Studies, 31*(5), 479-490.

Gulati, R. (1998). Alliances and networks. *Strategic Management Journal, 19*(4), 293-317.

Gunn, C. A., & Var, T. (1994). *Tourism Planning: Basics, Concepts, Cases* (3rd ed.). Washington, D.C.: Taylor & Francis.

Hall, C. M. (2009). Innovation and tourism policy in Australia and New Zealand: never the twain shall meet? *Journal of Policy Research in Tourism, Leisure and Events, 1*(1), 2-18.

Hall, C. M., & Williams, A. M. (2008). *Tourism and innovation*. New York: Routledge.

Halme, M. (2001). Learning for sustainable development in tourism networks. *Business Strategy and the Environment, 10*(2), 100-114.

Hamdouch, A. (2007). *Innovation Clusters and Networks: a critical review of the recent literature*. Paper presented at the 19th EAEPE Conference, Universidade do Porto, 1-3 November.

Hancock, G. R., & Mueller, R. O. (Eds.). (2010). *The Reviewer's Guide to Quantitative Methods in the Social Sciences*. New York: Routledge.

Hanneman, R. A., & Riddle, M. (2005). Introduction to Social Network Methods

Hargadon, A. (1998). Firms as Knolwedge Brokers: Lessons in Pursuing Continuous Innovation. *California Management Review, 40*(3), 209-227.

Harrison, D. (1995). Development of Tourism in Swaziland. *Annals of Tourism Research, 22*(1), 135-156.

Harvard Business School. (2003). *Harvard business essentials: managing creativity and innovation*. Boston, Mass.: Harvard Business School Press.

Haythornthwaite, C. (1996). Social Network Analysis: An Approach and Technique for the Study of Information Exchange. *Library and Information Science Research, 18* 323-342.

Haywood, K. M. (1986). Can the tourist area cycle of evolution be made operational? *Tourism Management, 7*(3), 154-167.

Haywood, K. M. (1991). Can the tourist-area life cycle be made operational? In S. Medlik (Ed.), *Managing Tourism* (pp. 31-38). London: Butterworth-Heinemann.

Henderson, R., & Clark, K. (1990). Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative Science Quarterly, 35*(1), 9-30. doi: 10.2307/2393549

Henry, N. & Pinch, S. (2000). Spatialising knowledge: Placing the knowledge community of motor sport valley. *Geoforum, 31*, 191–208.

Herkema, S. (2003). A complex adaptive perspective on learning within innovation projects. *The Learning Organization, 10*(6), 340-346.

Hewson, C. (2006). Primary Research. In V. Jupp (Ed.), *The Sage Dictionary of Social Research Methods* (pp. 237-238). London: SAGE Publications.

Hill, M. M., & Hill, A. (2000). *Investigação por questionário*. Lisboa: Edições Sílabo.

Hipp, C., & Grupp, H. (2005). Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies. *Research Policy, 34*(4), 517-535.

Hjalager, A.-M. (1997). Innovation patterns in sustainable tourism: An analytical typology. *Tourism Management, 18*(1), 35-41. doi: 10.1016/S0261-5177(96)00096-9

Hjalager, A.-M. (2002). Repairing Innovation Defectiveness in Tourism. *Tourism Management 23*(5), 465-474.

Hjalager, A.-M. (2010). A review of innovation research in tourism. *Tourism Management, 31*(1), 1-12.

Hjalager, A.-M., Huijbens, E. H., Björk, P., Nordin, S., Flagestad, A., & Knútsson, Ö. (2008). Innovation Systems in Nordic Tourism. Oslo: NICe - Nordic Innovation Centre.

Hofer, C. W. (1975). Toward a contingency theory of business strategy. *Academy of Management Journal, 18* (4), 785-810.

Holder, J. (1988). Pattern and impact of tourism on the environment of the Caribbean. *Tourism Management 9*(2), 119-127.

Hotz-Hart, B. (2000). Innovation Networks, Regions and Globalization. In G. L. Clark, M. P. Feldman & M. S. Gertler (Eds.), *The Oxford Handbook of Economic Geography* (pp. 432-450). Oxford: Oxford University Press.

House, J. (1954). *Geographical aspects of coastal holiday resorts.* (Unpublished PhD Thesis), Kings College, Durham.

Hovinen, G. (1981). A Tourism Cycle in Lancaster County, Pennsylvania. *The Canadian Geographer, 25*(3), 283-286.

Hovinen, G. (1982). Visitor cycles: outlook for tourism in Lancaster county. *Annals of Tourism Research, 9*(4), 565-583.

Hovinen, G. (2002). Revisiting the destination lifecycle model. *Annals of Tourism Research, 29*(1), 209-230.

Howell, D. C. (2008). *Fundamental statistics for the behavioral sciences*. Belmont: Wadsworth.

Howells, J. (1999). Regional Systems of Innovation? In D. Archibugi, J. Howells & J. Michie (Eds.), *Innovation Policy in a Global Economy* (pp. 67-93). Cambridge: Cambridge University Press.

Howells, J. (2002). Tacit Knowledge, Innovation and Economic Geography. *Urban Studies, 39*(5/6), 871-884.

Husbands, W. (1981). Centres, peripheries, tourism and socio-spatial development. *Ontario Geography, 17*, 37-59.

Imai, K., Nonaka, I., & Takeuchi, H. (1985). Managing the New Product Development. In K. Clark & R. Hayes (Eds.), *The Uneasy Alliance*. Boston: H.B.S. Press.

Instituto Nacional de Estatística - INE. (1970). *Estatísticas do Turismo, Continente e Ilhas Adjacentes - 1969*. Lisboa: INE.

Instituto Nacional de Estatística - INE. (2007). *Classificação Portuguesa das Atividades Económicas - Rev. 3*. Lisboa: INE.

Instituto Nacional de Estatística - INE. (2009). *Sistema de Contas Integradas das Empresas (Série 2004-2007)*. Lisboa: INE.

Instituto Nacional de Estatística – INE. http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_contas_nacionais&contexto=cs&selTab=tab3&perfil=97154797&INST=116634832

Instituto Nacional de Estatística - INE. (2012). *Anuário Estatístico da Região Norte - 2011*. Lisboa: INE.

Ingham, B. (1995). *Economics and development*. London ; New York: McGraw-Hill.

Instituto Português de Museus - IPM. (2011). Rede Portuguesa de Museus Retrieved 12th May, 2011, from http://www.ipmuseus.pt/rpm/museus_rpm/HighlightList.aspx

Ioannides, D. (1992). Tourism Development Agents: the Cypriot Resort Cycle. *Annals of Tourism Research, 19*(4), 711-713.

Iturriagagoitia, J. (2004). *Analysis and measurement of interactions in European Innovation Systems: A sectoral approach*. Paper presented at the Paper presented at the "Economics of Technological and Institutional Change" Doctoral Training Program (ETIC 2004), Maastricht, October 11th-22th.

Jackson, J., & Murphy, P. (2006). Clusters in regional tourism: An Australian case. *Annals of Tourism Research, 33*(4), 1018-1035.

Jacob, M., Tintoré, J., Aguiló, E., Bravo, A., & Mulet, J. (2009). Innovation in the tourism sector: results from a pilot study in the Balearic Islands. *Tourism Economics, 9*(3), 279-295.

Jacobs, J. (1969). *The economy of cities*. New York: Vintage.

Jaffe, A. B., & Trajtenberg, M. (2002). *Patents, citations, and innovations: a window on the knowledge economy*. Cambridge, Mass.: MIT Press.

Jaffe, A. B., Trajtenberg, M., & Henderson, R. (1993). Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations. *The Quarterly Journal of Economics, 108*(3), 577-598.

Jarillo, J. C. (1988). On strategic network. *Strategic Management Journal, 9*(1), 31-41.

Jarillo, J. C. (1993). *Strategic Networks: Creating the Borderless Organisation*. Oxford: Butterworth-Heinemann.

Jennings, G. (2001). *Tourism Research*. Australia: John Wiley & Sons.

Jensen, M. B., Johnson, B., Lorenz, E., & Lundvall, B. A. (2001). Forms of knowledge and modes of innovation. *Research Policy, 36*(5), 680-693.

Johansson, B. (2005). Parsing the menagerie of agglomeration and network externalities. In B. Karlsson, B. Johansson & R. R. Stough (Eds.), *Industrial Clusters and Inter-Firm Networks* (pp. 107-147). Cheltenham and Northampton: Edward Elgar Publishing.

Johnson, A., & Jacobsson, S. (2003). The emergence of a growth industry: a comparative analysis of the German, Dutch and Swedish Wind Turbine Industries. In J. S. Metcalfe & U. Cantner (Eds.), *Change, Transformation and Development: Schumpeterian perspectives* (pp. 197-227). Heidelberg and New York: Physica/Springer.

Johnston, R. J., Gregory, D., Pratt, G., & Watts, M. (Eds.). (2000). *The Dictionary of Human Geography*. Oxford: Blackwell Publishing.

Kastelle, T., & Steen, J. (2010). Are small world networks always best for innovation? *Innovation: management, policy & practice, 12*(1), 75–87.

Kautonen, M. (2006). *The Regional Innovation System bottom-up: A Finnish perspective.* (PhD thesis), University of Tampere.

Keller, C. P. (1984). Centre-periphery tourism development and control. In J. Long & R. Heacock (Eds.), *Leisure, tourism and social change, University of Edinburgh 1983*. Dunfermline, UK: Centre for Leisure Research, Dunfermline College of Physical Education.

Keller, C. P. (1987). Stages of peripheral tourism development - Canada's northwest territories. *Tourism Management, 8*(1), 20-32.

Ketels, C. H. M. (2003). *The development of Cluster concept - present experiences and further developments*. Paper presented at the NRW conference on clusters, Duisburg, Germany, 5 Dec.

Kilduff, M., & Tsai, W. (2003). *Social Networks and Organisations*. London: SAGE.

Kimberly, J. R. (1981). Managerial innovation. In P. C. Nystrom & W. H. Starbuck (Eds.), *Hand Book of Organization Design*. Oxford: Oxford University Press.

Kirat, T., & Lung, Y. (1999). Innovation and proximity - Territories as loci of collective learning processes. *European Urban and Regional Studies, 6*(1), 27-38.

Kirkham, R. L. (1984). Does the Gettier Problem Rest on a Mistake? *Mind 93* (372), 501-513.

Klepper, S. (1996). Entry, Exit, Growth, and Innovation over the Product Life Cycle. *The American Economic Review, 86*(3), 562-583.

Kline, S., & Rosenberg, N. (1986). An Overview of Innovation. In R. Landau & N. Rosenberg (Eds.), *The Positive Sum Strategy: Harnessing Technology for Economic Growth* (pp. 275-304). Washington, DC: National Academy Press.

Knoben, J., & Oerlemans, L. A. G. (2006). Proximity and inter-organizational collaboration: A literature review. *International Journal of Management Reviews, 8*(2), 71-89.

Knoke, D. (2001). *Changing Organizations: Business Networks in the New Political Economy*. Oxford: Westview Press.

Knoke, D., & Kuklinski, J. H. (1982). *Network Analysis*. London: Sage.

Knowles, T., & Curtis, S. (1999). The market viability of European mass tourist destinations. A post-stagnation life-cycle analysis. *International Journal of Tourism Research, 1*(2), 87-96.

Kolaczyk, E. D. (2009). *Statistical Analysis of Network Data: Methods and Models*. Boston: Springer.

Kolehmainen, J. (2003). Territorial Agglomeration as a Local Innovation Environment: The Case of a Digital Media Agglomeration in Tampere, Finland. *MIT IPC Local Innovation Systems Working Paper 03-002*.

Koput, K. W. (2010). *Social capital: An Introduction to Managing Networks*. Cheltenham: Edward Elgar.

Korres, G. M., Lionaki, I., & Polichronopoulos, G. (2003). The Role of Technical Change and Diffusion in the Schumpeterian Lines. *Joseph Alois Schumpeter*, 293-312.

Krackhardt, D. (1992). The Strength of Strong Ties: The Importance of Philos in Organizations. In N. Nohria & R. Eccles (Eds.), *Networks and Organizations: Structure, Form, and Action* (pp. 216-239). Boston: Harvard Business School Press.

Krackhardt, D., & Stern, R. N. (1988). Informal networks and organisational crisis: an experimental simulation. *Social Psychology Quarterly, 51*, 123-140.

Krapf, K. (1961). Les pays en voie de développement face au tourisme: Introduction méthodologique. *The Tourist Review, 16*(3), 82-89.

Kuhn, T. S. (1996, 1962). *The Structure of Scientific Revolutions* (3rd ed.). Chicago, IL: University of Chicago Press.

Lagendijk, A. (1997). Will New Regionalism survive? Tracing dominant concepts in economic geography *EUNIT Discussion Papers, N.º 10*. University of Newcastle upon Tyne: CURDS.

Lagendijk, A., & Lorentzen, A. (2007). Proximity, Knowledge and Innovation in Peripheral Regions. On the Intersection between Geographical and Organizational Proximity. *European Planning Studies, 15*(4), 457-466.

Lagiewski, R. M. (2006). The Application of TALC Model: A Literature Survey. In R. Butler (Ed.), *The Tourism Area Life Cycle - Vol. 1 Applications and Modifications* (pp. 27-50). Clevedon: Channel View Publications.

Lam, A. (1998). *Tacit knowledge, organisational learning and innovation: a societal perspective*. DRUID working paper no. 98-22. Aalborg University. Aalborg, Denmark.

Landabaso, M., Oughton, C. & Morgan, K. (1999). *Learning regions in Europe: theory, policy and practice through the RIS experience*. Paper presented at the Paper presented at the 3rd International Conference on Technology and Innovation Policy: Global Knowledge Partnerships. Creating Value for the 21st Century, Austin, USA.

Laws, E. (1995). *Tourist Destination Management*. London: Routledge.

Laws, E. (2009). Tourism and innovation. *Tourism Management, 30*(6), 935-936. doi: 10.1016/j.tourman.2008.11.010

Lazzeretti, L., & Petrillo, C. S. (Eds.). (2006). *Tourism Local Systems and Networking*. Amsterdam: Elsevier.

Leiper, N. (1979). The Framework of Tourism: Towards a Definition of Tourism, Tourist, and the Tourist Industry. *Annals of Tourism Research, 6*(4), 390-407.

Levitt, T. (1965). Exploit the product life-cycle. *Harvard Business Review, 43*(6), 81-94.

Lin, N. (2001). Building a Network Theory of Social Capital. In N. Lin, K. S. Cook & R. S. Burt (Eds.), *Social capital: theory and research.* New York: Aldine de Gruyter.

Liu, B. S.-C., Madhavan, R., & Sudharshan, D. (2005). DiffuNET: The impact of network structure on diffusion of innovation. *European Journal of Innovation Management, 8*(2), 240-262.

Liu, X., & White, S. (2001). Comparing Innovation Systems: A Framework and Application to China's Transitional Context. *Research Policy, 30*(7), 1091-1114.

Lorentzen, A. (2007). The Geography of Knowledge Sourcing - A Case Study of Polish Manufacturing Enterprises. *European Planning Studies, 15*(4), 467-486.

Lorenz, E. H. (1991). Neither Friends nor Strangers: Informal Networks of Subcontracting in French Industry. In G. Thompson, J. Frances, R. Levacic & J. Mitchell (Eds.), *Markets, Hierarchies and Networks: The Coordination of Social Life* (pp. 183-192). London: Sage.

Lorrain, F., & White, H. C. (1971). The structural equivalence of individuals in social networks. *Journal of Mathematical Sociology, 1*, 49-80.

Luecke, R. (2002). *Essentials of managing creativity and innovation*. Cambridge, MA: Harvard Business School Press.

Lundberg, D. E. (1980). *The Tourist Business*. Boston: Cahners Books.

Lundgren, J. O. (1983). Development Patterns and Lessons in the Montreal Laurentians. In P. E. Murphy (Ed.), *Tourism in Canada: Selected Issues and Options* (pp. 95-134): British Columbia: Department of Geography, University of Victoria.

Lundgren, J. O. (1984). Geographic concepts and the development of tourism research in Canada. *Geojournal, 9*(1), 17-25.

Lundgren, J. O. (2006). An Empirical Interpretation of the TALC: Tourist Product Life Cycles in the Eastern Townships of Quebec. In R. Butler (Ed.), *The Tourism Area Life Cycle - Vol.1. Applications and Modifications* (pp. 91-106). Clevedon: Channel View Publications.

Lundvall, B.-Å. (1992). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Pinter.

Lundvall, B.-Å. (1995). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Biddles.

Lundvall, B.-Å. (2007). National Innovation Systems - Analytical Concept and Development Tool. *Industry & Innovation, 14*(1), 95 - 119.

Lundvall, B.-Å., & Borrás, S. (1997). *The globalising learning economy: implications for innovation policy*. Luxembourg: European Commission, DG Science, Research and Development.

Lundvall, B.-Å., & Johnson, B. (1994). The learning economy. *Journal of Industry Studies, 1*(2), 23-42.

M'Chirgui, Z. (2012). Small-world or Scale-free phenomena in the Internet: What implications for the next-generation networks? *Review of European Studies, 4*(1), 85-93.

Mabogunje, A. L. (1980). *The Development Process: A Spatial Perspective*. London: Hutchinson.

Macbeth, J., & Carson, D. (2005). Regional Tourism Systems and the Implications of Innovative Behaviour. In D. Carson & J. Macbeth (Eds.), *Regional Tourism Cases: Innovation in Regional Tourism* (pp. 137-142). Cooperative Research Centre for Sustainable Tourism.

MacCallum, D., Moulaert, F., Hillier, J., & Haddock, S. V. (2009). Introduction. In D. MacCallum, F. Moulaert, J. Hillier & S. V. Haddock (Eds.), *Social innovation and territorial development*. Farnham, England; Burlington, VT: Ashgate.

Macchiavelli, A. (2009). Alpine Tourism: Development contradictions and conditions for innovation. *Revue de géographie alpine, 97*(1). Retrieved from http://rga.revues.org/index843.html

Madureira, L., Marques, M. C., & Costa, S. (2008). *Challenging conventional definitions and scales of innovation analysis and policies: the case of territory-based environment management*. Paper presented at the DIME International Conference "Innovation, sustainability and policy", University Montesquieu Bordeaux IV, France, 11-13 September. www.dime-eu.org/files/active/0/Madureira_et_al2008final.pdf

Maillat, D. (1993). The Innovation Process and the Role of the Milieu. In E. Bergman, G. Maier & F. Tödtling (Eds.), *Regions Reconsidered*. Suffolk: Ipswich Book Co Ltd.

Maillat, D., Quévit, M., & Senn, L. (Eds.). (1993). *Réseaux d'innovation et milieux innovateurs: un pari pour le développement régional*. Neuchâtel: GREMI/EDES.

Malecki, E. J. (1995). Culture as mediator of global and local forces. In B. Van der Knaap & R. Le Heron (Eds.), *Human resources and industrial spaces: A perspective on globalization and localization* (pp. 105-127). Chichester: John Wiley & Sons.

Malecki, E. J. (2002). Hard and Soft Networks for Urban Competitiveness. *Urban Studies, 39*(5/6), 929-945.

Malerba, F. (2005). Sectoral systems of innovation: a framework for linking innovation to the knowledge base, structure and dynamics of sectors. *Economics of Innovation and New Technology, 14*(1), 63 - 82.

Malmberg, A. (1997). Industrial geography: location and learning. *Progress in Human Geography, 21*(4), 573-582.

Malmberg, A., & Maskell, P. (2002). The Elusive Concept of Localization Economies: Towards a Knowledge-based Theory of Spatial Clustering. *Environment and Planning A, 34*(3), 429-449.

Malmberg, A., & Power, D. (2003). *(How) do (Firms in) Clusters create Knowledge?* Paper presented at the Paper presented at the DRUID Summer Conference 2003 on Creating, Sharing and Transfering Knowledge. The role of Geography, Institutions and Organizations, Copenhagen, June 12-14.

Malmberg, A., Solvell, O., & Zander, I. (1996). Spatial Clustering, Local Accumulation of Knowledge and Firm Competitiveness. *Geografiska Annaler, 78*(2), 85-97

Manente, M., & Minghetti, V. (2006). Destination management organization and actors. In D. Buhalis & C. Costa (Eds.), *Tourism Business Frontiers. Consumers, Products and Industry* (pp. 228-237). Oxford: Elsevier.

Markusen, A. (1996). Sticky places in slippery space: A typology of industrial districts. *Economic Geography, 72*(3), 293-313.

Marois, J., & Hinch, T. (2006). Seeking Sustainable Tourism in Northern Thailand: The Dynamics of the TALC. In R. Butler (Ed.), *The Tourism Area Life Cycle - Vol.1. Applications and Modifications* (pp. 250-268). Clevedon: Channel View Publications.

Marsden, P. V. (2005). Recent Developments in Network Measurement. In P. Carrington, J. Scott & S. Wasserman (Eds.), *Models and Methods in Social Network Analysis* (pp. 8-30). Cambridge: Cambridge University Press.

Marshall, A. (1890). *Principles of Economics*. London: Macmillan.

Martin, R., & Sunley, P. (2003). Deconstructing clusters: chaotic concept or policy panacea? *Journal of Economic Geography, 3*(1), 5-35.

Martínez-Ros, E., & Orfila-Sintes, F. (2009). Innovation activity in the hotel industry. *Technovation, 29*, 632–641. doi: 10.1016/j.technovation.2009.02.004

Maskell, P. (1998). Successful low-tech industries in high-cost environments: The case of the Danish furniture industry. *European Urban and Regional Studies 5*(1), 99-118.

Mathieson, A., & Wall, G. (1982). *Tourism - Economic, Physical and Social Impacts*. London: Longman.

Mattsson, J., Sundbo, J., & Fussing-Jensen, C. (2005). Innovation Systems in Tourism: The Roles of Attractors and Scene-Takers. *Industry & Innovation, 12*(3), 357-381.

Mayer, M. (2009). Innovation as a success factor in Tourism: epirical evidence from Western Austrian cable car companies. *Erdkunde, 63*(2), 123-139.

Maynard, M. (1994). Methods, practice and epistemology: The debate about Feminism and Research. In M. Maynard & J. Purvis (Eds.), *Researching Women's Lives from a Feminist Perspective* (pp. 10-27). London: Taylor and Francis.

McCann, P. (2008). Agglomeration Economies. In C. Karlsson (Ed.), *Handbook of Research on Cluster Theory*. Cheltenham and Northampton: Edward Elgar Publishing.

McCraw, T. K. (2007). *Prophet of innovation: Joseph Schumpeter and creative destruction*. Cambridge, Mass.: Belknap Press of Harvard University Press.

Meinert, R. G. Pardeck, J. T., & Kreuger, L. (2000). *Social Work: Seeking relevancy in the twienty-first century*. Binghamton: Haworth Press.

Mensch, G. (1979). *Stalemate in Technology: Innovations Overcome the Depression*. New York: Ballinger.

Michael, E. J. (Ed.). (2007). *Micro-clusters and Networks: The Growth of Tourism*. Oxford: Elsevier.

Miles, I. (2006). Innovation in Services. In J. Fagerberg, D. C. Mowery & R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 433-458). Oxford: Oxford University Press.

Mill, R. C., & Morrison, A. M. (1985). *The tourism system: An introductory text*. New Jersey: Prentice-Hall.

Miossec, J. (1976). Un modèle de space touristique. *L'Espace Geographique, 6* (1), 41-48.

Mitchell, J. C. (Ed.). (1969). *The concept and use of social networks: Analysis of personal relationships in Central African towns*. Manchester: University of Manchester Press.

Molina-Morales, F. X. (2002). Industrial districts and innovation: the case of the Spanish ceramic tiles industry. *Entrepreneurship & Regional Development, 14*(4), 317-335.

Molina-Morales, F. X., & Martínez-Fernández, M. T. (2010). Social Networks: Effects of Social Capital on Firm Innovation. *Journal of Small Business Management, 48*(2), 258-279.

Moody, J., & White, D. R. (2003). Structural Cohesion and Embeddedness: A Hierarchical Concept of Social Groups. *American Sociological Review, 68*(February), 103-127.

Moreno, R., Paci, R., & Usai, S. (2006). Innovation Clusters in the European Regions. *European Planning Studies, 14*(9), 1235-1263.

Morgan, K. (1997). The Learning Region: Institutions, Innovation and Regional Renewal. *Regional Studies, 31*(5), 491 - 503.

Morgan, K. (2001). *The exaggerated death of geography: localised learning, innovation and uneven development*. Paper presented at the The Future of Innovation Studies, Eindhoven

Centre for Innovation Studies, Eindhoven University of Technology, 20-23 September 2001.

Morgan, K. (2004). The exaggerated death of geography: learning, proximity and territorial innovation systems. *Journal of Economic Geography, 4*(1), 3-21.

Moulaert, F., Martinelli, F., & Swyngedouw, E. (2005). Towards alternative model(s) of local innovation. *Urban Studies, 42*(11), 1969-1990.

Moulaert, F., & Sekia, F. (2003). Territorial Innovation Models: A Critical Survey. *Regional Studies, 37*(3), 289 - 302.

Mowery, D. C. (1999). America's Industrial Ressurgence? An Overview *US Industry in 2000: Studies in Competitive Performance* (pp. 1-16). Washington, DC: National Academiy Press.

Mulgan, G. (2006). The Process of Social Innovation. *Innovations: Technology, Governance, Globalization, 1*(2), 145-162.

Murphy, P. E. (1985). *Tourism - A Community Approach*. New York: Methuen.

Nash, D. (1979). The Rise and Fall of an Aristocratic Tourist Culture: Nice 1763-1936. *Annals of Tourism Research, 6*(1), 61-75.

Neffke, F., Henning, M. S., Boschma, R., Lundquist, K.-J., & Olander, L.-O. (2008). Who Needs Agglomeration? Varying Agglomeration Externalities and the Industry Life Cycle. *Papers in Evolutionary Economic Geography, N. 08.08*. Retrieved from http://econ.geo.uu.nl/peeg/peeg0808.pdf

Negroponte, N. (1995). *Being Digital*. London: Coronet.

Nelson, R. R. (Ed.). (1993). *National systems of innovation: a comparative study*. New York: Oxford University Press.

Nelson, R. R., & Rosenberg, N. (1993). Technical innovation and national systems. In R. R. Nelson (Ed.), *National systems of innovation: A comparative study*. Oxford: Oxford University Press.

Nelson, R. R. & Winter, S. (1982). *An Evolutionary Theory of Economic Change*. Cambridge: Harvard University Press.

Neuman, W. L. (2000). *Social research methods, qualitative and quantitative approaches*. Boston: Allyn & Bacon.

Newman, M. E. J. (2003). The Structure and Function of Complex Networks. *SIAM Review, 45*(2), 167-256.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.

Nooteboom, B. (1999). Innovation and inter-firm linkages: new implications for policy. *Research Policy, 28*(8), 793–805.

Nooteboom, B. (2004). *Inter-firm Collaboration, Learning and Networks: An integrated approach*. London: Routledge.

Nordin, S. (2003). *Tourism Clustering and Innovation. Paths to Economic Growth and Development*. Östersund: European Tourism Research Institute.

Noronha, R. (1976). *Review of the Sociological Literature on Tourism*. New York: World Bank.

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.

North, D. C. (1991). Institutions. *Journal of Economic Perspectives, 5*(1), 97-112.

Novelli, M., Schmitz, B., & Spencer, T. (2006). Networks, clusters and innovation in tourism: A UK experience. *Tourism Management, 27*(6), 1141-1152.

O'Brien, D. (2006). *An Introduction to the Theory of Knowledge*. Cambridge: Polity Press.

O'Brien, R. (1992). *Global financial integration?: The end od geography*. London: Pinter.

O'Donnel, A., Gilmore, A., Cummins, D., & Carson, D. (2001). The network construct in entrepreneurship research: A review and critique. *Management Decision, 39*(9), 749-760.

O'Hare, G., & Barrett, H. (1997). The Destination Life Cycle - International Tourism in Peru. *Scottish Geographical Magazine, 113*(2), 66-73.

OECD. (1992). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 1st Edition*. Paris: OECD Publishing.

OECD. (1996). *The knowledge-based economy*. Paris: Organisation for Economic Co-operation and Development.

OECD. (1997a). *The Knowledge-Based Economy: A Set of Facts and Figures*. Paris: OECD.

OECD. (1997b). *The Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*. Paris: OECD.

OECD. (1997c). *Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data, 2nd Edition*. Paris: OECD Publishing.

OECD. (1997d). *Regulatory Reform: A Synthesis*. Paris: OECD.

OECD. (1999a). *Boosting Innovation: The Cluster Approach*. Paris: OECD.

OECD. (1999b). *Managing National Systems of Innovation*. Paris: OECD.

OECD. (2001). *Innovative Clusters: Drivers of the National Innovation Systems*. Paris: OECD.

OECD. (2002a). *Dynamising National Innovation Systems*. Paris: OECD Publishing.

OECD. (2002b). *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development, 6th Edition* Paris: OECD Publishing.

OECD. (2004). *Knowledge Management. Innovation in the Knowledge Economy: Implications for Education and Learning*. Paris: OECD.

OECD. (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition*. Paris: OECD Publishing.

OECD. (2006). *Innovation and Growth in Tourism*. Paris: OECD Publishing.

Ogilvie, F. W. (1933). *The Tourism Movement*. London: Staples Press.

Oglethorpe, M. K. (1984). Tourism in Malta: a crisis of dependence. *Leisure Studies, 3*(2), 147 - 161.

Orfila-Sintes, F., Crespí-Cladera, R., & Martínez-Ros, E. (2005). Innovation activity in the hotel industry: Evidence from Balearic Islands. *Tourism Management, 26*(6), 851-865.

Paget, E., Dimanche, F., & Mounet, J.-P. (2010). A tourism innovation case: An Actor-Network Approach. *Annals of Tourism Research, 37*(3), 828-847.

Papatheodorou, A. (2004). Exploring the evolution of tourism resorts. *Annals of Tourism Research, 31*(1), 219-237.

Patton, A. (1959). Top Management's Stake in Product Life Cycle. *Management Review, 18*(6).

Pavitt, K. (1984). Sectoral patterns of technical change: towards a taxonomy and a theory. *Research Policy, 13*(6), 343-373.

Pavitt, K., Robson, M., & Townsend, J. (1989). Technological accumulation, diversification and organisation in UK companies 1945-1983. *Management Science, 35*, 81-99.

Pavlovich, K. (2003). The evolution and transformation of a tourism destination network: the Waitomo Caves, New Zealand. *Tourism Management, 24*(2), 203-216.

Pavlovich, K. (2008). Network Governance and Connectivity: A Case Study. In N. Scott, R. Baggio & C. Cooper (Eds.), *Network Analysis and Tourism: From Theory to Practice*: Channel View Publications.

Pearce, D. G. (1979). Towards a geography of tourism. *Annals of Tourism Research, 6*(3), 245-272.

Pearce, D. G. (1987). *Tourism Today. A Geographical Analysis*. Harlow: Longman.

Pearce, D. G. (1989). *Tourist Development*. New York: John Wiley and Sons.

Pechlaner, H., Fischer, E. & Hammann, E.-M. (2006). Leadership and Innovation Processes—Development of Products and Services Based on Core Competencies. *Journal of Quality Assurance in Hospitality & Tourism, 6*(3), 31 - 57.

Peck, J. (2003). Places of Work. In E. Sheppard & T. J. Barnes (Eds.), *A Companion to Economic Geography*. Oxford: Blackwell Publishing.

Perroux, F. (1988). The pole of development's new place in a general theory of economic activity. In B. Higgins & D. Savoie (Eds.), *Regional Economic Development: Essays in Honour of Francois Perroux* (pp. 48-76). Boston, MA: Hyman.

Pestana, M. H., & Gageiro, J. N. (2005). *Análise de Dados para Ciências Sociais - A Complementaridade do SPSS*. Lisboa: Sílabo.

Peters, M., & Buhalis, D. (2008). Creativity and Innovation. In D. Tassiopoulos (Ed.), *New tourism ventures: an entrepreneurial and managerial approach* (pp. 47-60). South Africa: Juta Pty Ltd.

Peters, M., & Pikkemaat, B. (2006). Innovation in Tourism. *Journal of Quality Assurance in Hospitality & Tourism, 6*(3), 1 - 6.

Peters, M., & Pikkemaat, B. (Eds.). (2005). *Innovation in hospitality and tourism*. New York: The Hayworth Press.

Petrillo, C. S., & Swarbrooke, J. (Eds.). (2005). *Networking and Partnership in Destinations and Development Management* (Vol. II). Naples: Enzo Albano.

Phillips, A. (1971). *Technology and market structure: a study of the aircraft industry*. Lexington, Mass.: Heath Lexington Books.

Pikkemaat, B., & Peters, M. (2006). Towards the Measurement of Innovation—A Pilot Study in the Small and Medium Sized Hotel Industry. *Journal of Quality Assurance in Hospitality & Tourism, 6*(3), 89-112.

Pimlott, J. (1947). *The englishman's holiday*. London: Faber.

Piore, M. J., & Sabel, C. F. (1984). *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic Books.

Pizam, A. (1994). Planning a Tourism Research Investigation. In J. R. Ritchie & C. R. Goeldner (Eds.), *Travel, Tourism and Hospitality Research: a Handbook for Managers and Researchers* (pp. 91-104). Chichester: John Wiley & Sons.

Pizam, A. (2007). Does the tourism/hospitality industry possess the characteristics of a knowledge-based industry? *International Journal of Hospitality Management, 26*(4), 759-763.

Plessis, M. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management, 11* (4), 20-29.

Plog, S. C. (1972). *Why destination areas rise and fall in popularity*. Paper presented at the Paper presented at the South California Chapter of the Travel Research Bureau, October 10.

Plog, S. C. (1974). Why destination areas rise and fall in popularity. *Cornell Hotel and Restaurant Administration Quarterly, 14*(4), 55-58

Plog, S. C. (2001). Why Destination Areas Rise and Fall in Popularity. An Update of a Cornell Quartely Classic. *Cornell Hotel and Restaurant Administration Quarterly, 42*(3), 13-24. doi: 10.1177/0010880401423001

Polanyi, M. (1966). *The tacit dimension*. New York: Anchor Day Books.

Poon, A. (1993). *Tourism, Technology and Competitive Strategies*. Wallingford: CAB International.

Porter, M. E. (1990). *The competitive advantage of nations*. London and Basingstoke: Macmillan.

Porter, M. E. (1996). Competitive advantage, agglomeration economies and regional policy. *International Regional Science Review, 19* (1), 85-94.

Porter, M. E. (1998a). Clusters and the New Economics of Competition. *Harvard Business Review, 76*(6), 77-90.

Porter, M. E. (1998b). *On Competition*. Boston: Harvard Business School Publishing.

Porter, M. E. (2001). Innovation: Location Matters. *MIT Sloan Management Review, 42*(4), 28-36.

Pouder, R. & St John, C. H. (1996). Hot Spots and Blind Spots: geographical clusters of firms and innovation. *Academy of Management Review, 21*(4), 1192-1225.

Powell, W. (1990). Neither Market nor Hierarchy: Network Forms of Organisation. In B. M. Straw & L. L. Cummings (Eds.), *Research in Organisational Behaviour* (pp. 295-336). Greenwich: JAI Press.

Powell, W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly, 41*, 116-145.

Powell, W., & Grodal, S. (2006). Networks of Innovators. In J. Fagerberg, D. C. Mowery & R. Nelson (Eds.), *The Oxford Handbook of Innovation*. Oxford: Oxford University Press.

Prats, L., Guia, J., & Molina, F.-X. (2008). How tourism destinations evolve: The notion of Tourism Local Innovation System. *Tourism and Hospitality Research, 8*, 178–191.

Preissl, B., & Solimene, L. (2003). *The dynamics of clusters and innovation*. Heidelberg and New York: Physica-Verlag.

Presenza, A., & Cipollina, M. (2010). Analysing tourism stakeholders networks. *Tourism Review, 65*(4), 17-30.

Prideaux, B. (2000). The resort development spectrum - a new approach to modelling resort development. *Tourism Management, 21*(3), 225-240.

Prosser, G. (1995). *Tourism Destination Life Cycles: Progress, Problems and Prospects.* Paper presented at the National Tourism and Hospitality Conference, Melbourne.

Pulina, M., & Biagi, B. (2006). Regional Public Policy and Tourism Life Cycle: the Case of Sardinia. In ERSA conference papers (Ed.): European Regional Science Association.

Putnam, R. (1993). *Making democracy work. Civic traditions in modern Italy*. Princeton: Princeton University Press

Putnam, R. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York: Touchstone.

Raspe, O., & Oort, F. v. (2007). What When Space Matters Little For Firm Productivity? A multilevel analysis of localised knowledge externalities. *Papers in Evolutionary Economic Geography, No. 07.06*. Retrieved from http://econ.geo.uu.nl/peeg/peeg0706.pdf

Ratti, R. (1992). *Innovation Technologique et Développement Régional*. Lausanne: Mèta-Editions.

Rickne, A. (2000). *New Technology-Based Firms and Industrial Dynamics. Evidence from the Technological System of Biomaterials in Sweden, Ohio and Massachussets.* (PhD Thesis), Chalmers University of Technology, Göteborg.

Rodríguez, A. (2009). Social Innovation for Neighbourhood Revitalization: A Case of Empowered Participation and Integrative Dynamics in Spain. In D. MacCallum, F. Moulaert, J. Hillier & S. V. Haddock (Eds.), *Social innovation and territorial development* (pp. 81-100). Farnham, England; Burlington, VT: Ashgate.

Rogers, E. M. (2003). *Diffusion of Innovations* (5ed. ed.). New York: Free Press.

Romer, P. (1986). Increasing Returns and Long-Run Growth. *Journal of Political Economy, 94*(5), 1002-1037.

Rønningen, M. (2010). Innovative processes in a nature-based tourism case: The role of a tour-operator as the driver of innovation. *Scandinavian Journal of Hospitality and Tourism, 10*(3), 190-206.

Rosenberg, N. (1982). *Inside the Black Box: Technology and Economics*. Cambridge: Cambridge University Press.

Rosenfeld, S. A. (1997). Bringing business clusters into the mainstream of economic development. *European Planning Studies, 5*(1), 3.

Rosenthal, S., & Strange, W. (2003). Geography, industrial organisation, and agglomeration. *The Review of Economics & Statistics, 85*, 377-393.

Rostow, W. W. (1990). *The stages of economic growth: a non-communist manifesto* (3rd ed.). Cambridge and New York: Cambridge University Press.

Rothwell, R. (1992). Successful Industrial Innovation: Critical Factors for the 1990s. *R&D Management, 22*(3), 221-239.

Rothwell, R. (1994). Towards the Fifth-generation Innovation Process. *International Marketing Review, 11*(1), 7-31.

Rothwell, R., & Gardiner, P. (1988). Re-Innovation and Robust Designs: Producer and User Benefits. *Journal of Marketing Management, 3*(3), 372-287.

Roux, K., Dang, R. J., Thomas, C., Longhi, C., & Talbot, D. (2009). *Territorial Innovation Dynamics: a Knowledge Based Perspective*. Paper presented at the 25th EGOS Colloquium, European Group for Organizational Studies, The strategic management of organizational knowledge: Creation versus control, Barcelona, Spain, 2-4 July.

Ruef, M. (2002). Strong Ties, Weak Ties and Islands: Structural and Cultural Predictors of Organizational Innovation. *Industry and Corporate Change, 11*, 427-449.

Russell, R., & Faulkner, B. (1998). Reliving the destination life cycle in Coolangatta: an historical perspective on the rise, decline and rejuvenation of an Australian seaside resort. In E. Laws, Faulkner, B. and Moscardo, G. (Ed.), *Embracing and Managing Change in Tourism: International Case Studies* (pp. 95-115). London: Routledge.

Russell, R., & Faulkner, B. (2004). Entrepreneurship, Chaos and the Tourism Area Lifecycle. *Annals of Tourism Research, 31*(3), 556-579.

Russo, A. P. (2002). The "vicious circle" of tourism development in heritage cities. *Annals of Tourism Research, 29*(1), 165-182.

Rutten, R., & Boekema, F. (2007a). The learning region: a conceptual anatomy. In R. Rutten & F. Boekema (Eds.), *The Learning Region: Foundations, State of the Art, Future* (pp. 127-141). Cheltenham and Northampton: Edward Elgar.

Rutten, R., & Boekema, F. (2007b). The Learning Region: Foundations, State of the Art, Future. In R. Rutten & F. Boekema (Eds.), *The Learning Region: Foundations, State of the Art, Future* (pp. 1-11). Cheltenham and Northampton: Edward Elgar.

Saarinen, J. (1998). The Social Construction of Tourist Destinations, The Process of Transformaitons of the Saariselkä Tourism Region in Finish Lapland. In G. Ringer (Ed.), *Destinations, Cultural Landscapes of Tourism* (pp. 154-173). London: Routledge.

Sabel, C. F. (1988). Flexible Specialization and the Re-emergence of Regional Economies. In P. Hirst & J. Zeitlin (Eds.), *Reversing Industrial Decline*. Oxford: Berg.

Saxena, G. (2005). Relationships, networks and the learning regions: Case evidence from the Peak District National Park. *Tourism Management, 26*, 277-289.

Saxena, G., & Ilbery, B. (2008). Integrated rural tourism: A border case study. *Annals of Tourism Research, 35*(1), 233-254.

Saxenian, A. L. (1994). *Regional Advantage: Culture and Competition in Silicon Valey and Route 128*. Cambridge: Harvard University Press.

Schianetz, K., Kavanagh, L., & Lockington, D. (2007). The Learning Tourism Destination: The potential of a learning organisation approach for improving the sustainability of tourism destinations. *Tourism Management, 28*(6), 1485-1496.

Schilling, M., & Phelps, C. (2007). Interfirm collaboration networks: the impact of large-scale network structure on firm innovation. *Management Science, 53*, 1113-1126.

Schumpeter, J. A. (1934). *The Theory of Economic Development: an inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, Mass.: Harvard University Press.

Schumpeter, J. A. (1942). *Capitalism, Socialism and Democracy*. New York: Harper & Brothers.

Schumpeter, J. A. (1982). *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle* Transaction Publishers

Scitovski, T. (1954). Two concepts of external economies. *Journal of Political Economy, 62*, 143-151.

Scott, A. J. (1988). *New Industrial Spaces*. London: Pion Ltd.

Scott, A. J. (2004). Flexible production systems and regional development: the rise of New Industrial Spaces in North America and Western Europe In J. Peck, E. Sheppard & T. J. Barnes (Eds.), *Reading Economic Geography*. Oxford: Blackwell Publishing.

Scott, J. (2000). *Social Network Analysis: A Handbook*. London: Sage.

Scott, N., Baggio, R., & Cooper, C. (2008). *Network Analysis and Tourism: From Theory to Practice*. Clevedon: Channel View Publications.

Scott, N., Cooper, C., & Baggio, R. (2008). Destination Networks: Four Australian Cases. *Annals of Tourism Research, 35*(1), 169-188.

Scott, W. R. (2001). *Institutions and Organisations*. London: Sage.

Seers, D. (1969). The meaning of development. *International Development Review, 11*(4).

Semitiel García, M. (2006). *Social Capital, Networks and Economic Development: An Analysis of Regional Productive Systems*. Cheltenham: Edward Elgar.

Shavinina, L. V. (2003). *The International Handbook on Innovation*. Oxford: Elsevier.

Shaw, G., & Williams, A. (2009). Knowledge transfer and management in tourism organisations: An emerging research agenda. *Tourism Management, 30*(3), 325-335.

Simmie, J. (2004). Innovation and clustering in the globalised international economy. *Urban Studies, 41*(5/6), 1095-1112.

Simmie, J. (2005). Innovation and Space: A Critical Review of the Literature. *Regional Studies, 39*(6), 791-806.

Simmie, J., & Sennett, J. (1999). Innovation in the London metropolitan region. In D. Hart, J. Simmie, P. Wood & J. Sennett (Eds.), *Innovative clusters and competitive cities in the UK and Europe, Working Paper No. 182*: Oxford Brookes School of Planning.

Sirilli, G., & Evangelista, R. (1998). Technological innovation in services and manufacturing: results from Italian surveys. *Research Policy, 27*(9), 881-899.

Skinner, A. (2000). Napa Valley, California: A Model of Wine Region Development. In C. M. Hall, L. Sharples, B. Cambourne, N. Macionis, R. Mitchell & G. Johnson (Eds.), *Wine Tourism Around the World Development, Management and Markets* (pp. 283-296). Boston: Butterworth-Heinemann.

Skyttner, L. (2005). *General systems theory : problems, perspectives, practice* (2nd ed.). Hackensack, NJ: World Scientific.

Smith, K. (1997). Economic Infrastructures and Innovation Systems. In C. Edquist (Ed.), *Systems of Innovation: Technologies, Institutions and Organisations* (pp. 86-106). London: Pinter.

Smith, R. A. (1991). Beach resorts: A model of development evolution. *Landscape and Urban Planning, 21*(3), 189-210.

Smith, S. L. J. (1989). *Tourism Analysis: A Handbook*. Harlow: Longman.

Smits, R. (2002). Innovation studies in the 21st century: Questions from a user's perspective. *Technological Forecasting and Social Change, 69*(9), 861-883.

Snow, R. E., & Wright, D. E. (1976). Coney Island: A Case Study In Popular Culture and Technological Change. *Journal of Popular Culture, 9*(4), 960-975.

Sørensen, F. (2007). The Geographies of Social Networks and Innovation in Tourism. *Tourism Geographies, 9*(1), 22-48.

Squire, S. J. (1998). Rewriting languages of geography and tourism: cultural discourses of destinations, gender and tourism history in the Canadian Rockies. In G. Ringer (Ed.), *Destinations, Cultural Landscapes of Tourism* (pp. 80-100). London: Routledge.

Stansfield, C. (1978). Atlantic City and the Resort Cycle: Background to the Legalisation of Gambling. *Annals of Tourism Research, 5*(2), 238-251.

Steen, J., MacAuley, S., & Kastelle, T. (2010). *A review and critique of the small world hypothesis: the best network structure for innovation?* Paper presented at the DRUID Summer Conference 2010 on "Opening Up Innovation: Strategy, Organisation and Technology", London, June 16th-18th.

Sternberg, R. (2000). Innovation Networks and Regional Development—Evidence from the European Regional Innovation Survey (ERIS): Theoretical Concepts, Methodological Approach, Empirical Basis and Introduction to the Theme Issue. *European Planning Studies, 8*(4), 389 - 407.

Storper, M. (1992). The limitations to globalization: technology districts and international trade. *Economic Geography, 68*(1), 60-93.

Storper, M. (1997). *The Regional World: Territorial Development in a Global Economy*. New York: Guilford Press.

Storper, M., & Scott, A. J. (1988). The geographical foundations and social regulation of flexible production complexes. In J. Wolch & M. Dear (Eds.), *The Power of Geography: how territory shapes social life* (pp. 21-40). London: Allen & Unwin.

Strapp, J. D. (1988). The Resort Cycle and Second Homes. *Annals of Tourism Research, 15*(4), 504-516.

Sumner, M. (2006). Epistemology. In V. Jupp (Ed.), *The Sage Dictionary of Social Research Methods* (pp. 92-94). London: SAGE

Sundbo, J. (1997). Management of innovation in services. *Service Industries Journal, 17*(3), 432-455.

Sundbo, J. (1998a). *The organisation of innovation in services*. Roskilde: Roskilde University Press.

Sundbo, J. (1998b). *The Theory of Innovation - Entrepreneurs, Technology and Strategy*. Cheltenham: Edward Elgar.

Sundbo, J., Orfila-Sintes, F., & Sørensen, F. (2007). The innovative behaviour of tourism firms - comparative studies of Denmark and Spain. *Research Policy, 36*, 88-106.

Swan, J. & Rink, D. (1982). Fitting Market Strategy to Varying Product Life Cycles. *Business Horizons, 25*(January/February), 72-76.

Swan, J., Scarborough, H., & Robertson, M. (2003). Linking Knowledge, Networking and Innovation Processes: A Conceptual Model. In L. V. Shavinina (Ed.), *The International Handbook on Innovation*. Oxford: Elsevier.

Swarbrooke, J., Smith, M., & Onderwater, L. (Eds.). (2004). *Networking and Partnership in Destinations and Development Management: ATLAS Reflections 2004*. Arnhem: ATLAS.

Szarka, J. (1990). Networking and small firms. *International Small Business Journal, 8*(2), 10-21.

Tarnai, J., & Paxson, M. C. (2004). *Survey Mode Preferences of Business Respondents*. Paper presented at the Paper presented at the annual meeting of the American Association for Public Opinion Research, Phoenix, Arizona, May.

Telfer, D. J. (2002). The Evolution of Tourism and Development Theory. In R. Sharpley & D. J. Telfer (Eds.), *Tourism and Development: concepts and issues*. Clevedon: Channel View Publications.

Tether, B. S. (2004). Do Services Innovate (Differently)? *Discussion Paper CRIC No 66*: Centre for Research on Innovation and Competition, University of Manchester.

Tether, B. S. (2005). Do Services Innovate (Differently)? Insights from the European Innobarometer Survey. *Industry & Innovation, 12*(2), 153 - 184.

Thirlwall, A. P. (1989). *Growth & Development: with special reference to developing economies* (4th Edition ed.). London: Macmillan.

Thompson, G., Frances, J., Levacic, R., & Mitchell, J. (Eds.). (1991). *Markets, Hierarchies and Networks: The Coordination of Social Life*. London: Sage.

Thompson, V. A. (1965). Bureaucracy and innovation. *Administrative Science Quarterly, 10*(1), 1-20.

Thorelli, H. B. (1986). Networks: Between markets and hierarchies. *Strategic Management Journal, 7*(1), 37-51.

Thurot, J. (1973). *Le Tourism Tropical Baleaire: le modele Caribbean et ses Extensions*. Aix-en-Provence: Center for the Study of Tourism.

Tinsley, R., & Lynch, P. (2001). Small Tourism Business Networks and Destination Development. *International Journal of Hospitality Management, 20*, 367-378.

Todaro, M. P., & Smith, S. C. (2008). *Economic Development* (10th Edition ed.). London: Pearson Education.

Torre, A., & Gilly, J. P. (2000). On the Analytical Dimension of Proximity Dynamics. *Regional Studies, 34*(2), 169-180.

Torre, A., & Rallet, A. (2005). Proximity and localization. *Regional Studies, 39*(1), 47-59.

Tracey, P., & Clark, G. L. (2003). Alliances, Networks and Competitive Strategy: Rethinking Clusters of Innovation. *Growth & Change, 34*(1), 1-16.

Tremblay, D. G., Fontan, J. M., Klein, J. L., & Rousseau, S. (2003). Territorial Proximity and innovation: a survey in the Montréal region. *Revue d'économie rurale et urbaine, 5*, 835-852.

Tribe, J. (1997). The Indiscipline of Tourism. *Annals of Tourism Research, 24* (3), 638-657.

Tsai, W., & Ghoshal, S. (1998). Social Capital and Value Creation: The role of intrafirm networks. *Academy of Management Journal, 41*, 464-476.

Turismo de Portugal. (2011). Descubra Portugal. Retrieved 12th May, 2011, from www.descubraportugal.com.pt

Turner, J. H. (2003). The Origins of Positivism: The Contributions of August Comte and Herbert Spencer. In G. Ritzer & B. Smart (Eds.), *Handbook of Social Theory* (pp. 30-42). London: SAGE.

Tushman, M., & Nadler, D. (1986). Organizing for Innovation. *Califórnia Management Review, 28*(3), 74-92.

Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organisational environments. *Administrative Science Quarterly, 31*, 439-465.

Tushman, M. L., Anderson, P. C., & O'Reilly, C. (1997). Technology cycles, innovation streams, and ambidextrous organizations: organizational renewal through innovation streams and

strategic change. In M. L. Tushman & P. Anderson (Eds.), *Managing strategic innovation and change: A collection of readings* (pp. 3-23). New York: Oxford University Press.

Ujjual, V. (2008). *High technology firm performance, innovation and networks: an empirical analysis of firms in Scottish high technology clusters.* (PhD Thesis), University of St. Andrews.

United Nations - UN. (2005). 2005 World Summit Outcome. Retrieved from http://www.who.int/hiv/universalaccess2010/worldsummit.pdf

UNESCO. (2011). World Heritage List - Alto Douro Wine Region Retrieved 19th November, 2011, from http://whc.unesco.org/en/list/1046

UNSD, EUROSTAT, OECD, & UNWTO. (2008). 2008 Tourism Satellite Account: Recommended Methodological Framework. Retrieved from http://unstats.un.org/unsd/statcom/doc08/BG-TSA.pdf

United Nations World Tourism Organisation - UNWTO. (2007). *2008 International Recommendations for Tourism Statistics*. Madrid, New York: UNWTO.

Urry, J. (1990). *The Tourist Gaze: Leisure and Travel in Contemporary Societies*. London: Sage.

Utterback, J., & Abernathy, W. (1975). A Dynamic Model of Process and Product Innovation. *Omega, 3*(6), 639-656.

Uzzi, B. (1996). The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect. *American Sociological Review, 61*(4), 674-698.

Uzzi, B. (1997). Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly, 42*(1), 35-67.

Uzzi, B., & Spiro, J. (2005). Collaboration and creativity: the small world problem. *The American Journal of Sociology, 111*(2), 447-504.

van Geenhuizen, M., & Nijkamp, P. (2000). The learning capabilities of regions: Conceptual policies and patterns. In F. Boekema, K. Morgan, S. Bakkers & R. Rutten (Eds.), *Knowledge, innovation and economic growth: The theory and practise of learning regions* (pp. 38-56). Cheltenham: Edward Elgar.

Varga, A. (2000). Universities in local innovation systems. In Z. J. Acs (Ed.), *Regional innovation, knowledge and global change*. London: Pinter.

Veal, A. J. (1997). *Research Methods for Leisure and Tourism. A Practical Guide*. London: Pitman.

Verspagen, B., & Duysters, G. (2004). The Small Worlds of Strategic Technology Alliances. *Technovation, 24*(7), 563-571.

Vonortas, N. S. (2009). Innovation Networks in Industry. In F. Malerba & N. S. Vonortas (Eds.), *Innovation Networks in Industries* (pp. 27-44). Cheltenham: Edward Elgar.

Wanhill, S. (1997). Peripheral Area Tourism: A European Perspective. *Progress in Tourism and Hospitality Research, 3*(1), 47-70.

Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Watts, D. J. (2004). The "New" Science of Networks. *Annual Review of Sociology 30*, 243-270.

Watts, D. J., & Strogatz, S. H. (1998). Collective dynamics of 'small-world' networks. *Nature, 393*, 440-442.

World Commission on Environment and Development - WCED. (1987). *Our common future*. Oxford: Oxford University Press.

Weaver, D. B. (1988). The Evolution of a 'Plantation' Tourism Landscape on the Caribbean Island of Antigua. *Tijdschrift voor economische en sociale geografie, 69*, 319-331.

Weaver, D. B. (1992). Tourism and the Functional Transformation of the Antiguan Landscape. In A. M. Conny (Ed.), *Spatial Implications of Tourism* (pp. 161-175). Groningen: Geo Pers.

Weaver, D. B. (2000). A Broad Context Model of Destination Development Scenarios. *Tourism Management 21*(3), 217-224.

Weber, R. (2004). Editor's comments: the rhetoric of positivism versus interpretivism: a personal view. *MIS Quarterly, 28*(1), iii-xii.

Weidenfeld, A., Williams, A. M., & Butler, R. W. (2010). Knowledge transfer and innovation among attractions. *Annals of Tourism Research, 37*(3), 604-626.

Weiermair, K. (2005). Prospects for Innovation in Tourism - Analyzing the Innovation Potential Throughout the Tourism Value Chain. *Journal of Quality Assurance in Hospitality & Tourism, 6*(3), 59 - 72.

Wiig, H., & Wood, M. (1995). What Comprises a Regional Innovation System? An Empirical Study *STEP Report R-01*.

Wilkinson, P. F. (1996). Graphical Images of the Commonwealth Caribbean. The Tourist Area Cycle of Evolution. In L. C. Harrison & W. Husbands (Eds.), *Practicing Responsible Tourism. International Case Studies in Tourism Planning, Policy, and Development* (pp. 16-40). New York: John Wiley and Sons.

Williams, M. T. (1993). An Expansion of the Tourist Site Cycle Model: The Case of Minorca (Spain). *The Journal of Tourism Studies, 4*(2), 24-32.

Wolfe, R. I. (1952). Wasaga Beach - The divorce from the geographic environment. *The Canadian Geographer, 1*(2), 57-66.

World Bank. (1992). *Governance and Development*. Washington: World Bank Publications.

World Tourism Organisation. (2005). Adapting the National Tourism Satellite Account (TSA) Project to Subnational Levels - A Discussion Paper.

Wright, K. B. (2005). Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. *Journal of Computer-Mediated Communication, 10*(3).

Young, B. (1983). Touristisation of traditional Maltese fishing-farming villages. *Tourism Management, 4*(1), 35-41.

Zeithaml, V. A. Parasuraman, A., & Berry, L. L. (1985). Problems and Strategies in Services Marketing. *Journal of Marketing, 49*(2), 33-46.

Zhong, L., Deng, J., & Xiang, B. (2008). Tourism development and the tourism area life-cycle model: A case study of Zhangjiajie National Forest Park, China. *Tourism Management, 29*(5), 841-856.

Zizalova, P. (2009). *Emerging innovation modes and (regional) innovation systems in the Czech Republic*. Paper presented at the Working Papers on Innovation Studies, Centre for Technology, Innovation and Culture, University of Oslo.

Appendices

Appendix 1 – Activities and functions of innovation systems

Author	Definition	Activities/Functions
Edquist, 2004, 2006 Chaminade & Edquist, 2005	Activities in SI: factors that influence the development, diffusion and use of innovation ('overall function')=determinants of innovation	**Provision of knowledge inputs to the innovation process** • Provision of R&D, creating new knowledge • Competence building in labour force to be used in innovation activities (provision of education and training, creation of human capital, production and reproduction of skills, individual learning) **Provision of markets – demand-side factors** • Formation of new product markets • Articulation of quality requirements emanating from demand side with regard to new products **Provision of constituents of SI** • Creating/changing organizations needed for the development of new fields of innovation (e.g. enhancing entrepreneurship to create new firms and intrapreneurship to diversify existing firms, new research organizations, policy agencies) • Networking, including interactive learning between different organizations (integrating new knowledge elements from different spheres of SI and coming from outside with elements already available) • Creating and changing institutions that influence innovation **Support services for innovation firms** • Incubating activities (access to facilities, administrative support, etc) • Financing of innovation processes • Provision of consultancy services relevant for innovation processes
Bergek et al, 2008	Functions defined as the contribution of a component or a set of components to the overall function of the IS	• Knowledge development and diffusion • Influence on the direction of search (incentives and/or pressures for organizations to enter IS and on the direction of search within IS) • Entrepreneurial experimentation (main source of uncertainty reduction; IS without entrepreneurship stagnates) • Market formation (3 phases: nursing market; bridging market; mature/mass market) • Legitimation (social acceptance and compliance with new IS/innovations developed within) • Resource mobilization (mobilize competence/human capital through education in specific fields as well as in entrepreneurship, management and finance, financial capital, and complementary assets – complementary products, services, network infrastructure. • Development of positive external economies (emergence of pooled labour markets, emergence of specialized intermediate goods and services, information flows and knowledge spillovers)
Borrás, 2004	Functions as the activities of the different organisations in the SI affecting innovation performance (specifically the role of institutions)	3 generic functions: reduce uncertainty; manage conflict and cooperation; provide incentives 10 specific functions: 1) Production of knowledge 2) Diffusion of knowledge 3) Appropriation of knowledge

Author	Definition	Activities/Functions
		4) Regulation of labour markets 5) Financing innovation 6) Alignment of actors 7) Guidance of innovators 8) Reduction of technological diversity 9) Reduction of risk 10) Control of knowledge use
Liu & White, 2001	Activities are factors that influence the development, diffusion and use of technical innovation. They include important inputs to research activity as well as the use of research outputs.	1) Research (basic, developmental, engineering) 2) Implementation (manufacturing) 3) End-use (customers of the product or process outputs) 4) Linkage (bringing together complementary knowledge) 5) Education
Anna Johnson, s/d	Function: contribution of a component or set of components to the systems' overall goal	Functions directly related to the innovation process: 1) Identify problem (identification of bottlenecks or functional failures) 2) Create new knowledge (entirely new or combination of existing and new in an innovative way) Support functions (indirectly support innovation process) 1) Supply incentives to engage in innovative work 2) Supply resources (namely funding) 3) Guide the direction of search (direction in which actors deploy their resources) 4) Recognise the potential for growth of the innovation 5) Facilitate the exchange of information and knowledge 6) Stimulate/create markets 7) Reduce social uncertainty (uncertainty about how others will act and react/ prevent or solve conflicts) 8) Counteract the resistance to change (when an innovation is introduced - legitimacy)
Galli & Teubal, 1997	Factors affecting the production and diffusion of innovations	Hard functions (related to knowledge creation) 1) R&D involving universities and public and non-profit organizations 2) Supply of scientific and technical services to third parties by firms, technological centers, universities, governmental laboratories, etc. Soft functions (support knowledge creation) 1) Diffusion of information, knowledge and technology towards economic and public operators (interface between knowledge suppliers and users) – bridging organizations 2) Policy-making (by government, academies, universities, technology assessment offices, etc) 3) Design and implementation of institutions (patents, laws, standards, regulations, certifications, etc) - by public or intermediate organisations 4) Diffusion of scientific culture (through science museums, science centres, etc. 5) Professional coordination through academies, professional associations, etc.

Author	Definition	Activities/Functions
David and Foray, 1994, 1995	Focus on the performance of the system of innovation regarding the distribution of knowledge.	Five processes: 1) Distribution of knowledge among universities, research institutions and industry; 2) DoK within a market and between suppliers and users; 3) Re-use and recombination of knowledge; 4) DoK among decentralised R&D projects; 5) Dual development of civilian and military technologies.
Johnson & Jacobson, 2003	Factors that affect the knowledge production process	1) Create new knowledge 2) Guide the direction of search process of suppliers and customers 3) Supply resources (capital, competence and others) 4) Facilitate the creation of positive external economies (exchange of information, knowledge and visions) – involves the formation of networks 5) Facilitate the formation of markets (includes legitimising new technology and removing legislative obstacles)
OECD, 2002	Functions to be considered in a comprehensive innovation policy	• Enhancing firm innovative capabilities (capacity building, knowledge flows through networks, mobility of human resources within and between firms and universities) • Exploiting the power of markets (incentive innovation, knowledge provision) • Securing investment in knowledge • Promoting the commercialisation of publicly funded research • Promoting cluster development • Promoting internationally open networks
Rickne, 2000		1) Create human capital through education 2) Create and diffuse technological opportunities 3) Create and diffuse new products 4) Incubate to provide facilities, equipment and administrative support 5) Facilitate regulations for technologies, materials and products (may enlarge market and create market access) 6) Legitimise technologies and firms facilitate market access and the provision of money, human capital and networks) 7) Create markets and diffuse market knowledge 8) Enhance networking (gives access to new resources) 9) Direct technology, market and partner research (concerning technologies, markets and networks) 10) Facilitate financing (monetary resources and share risk) 11) Create labour market that firms can use

Appendix 2 – Empirical studies on regional innovation systems

Author	Objectives/Hypothesis	Methodology	Variables/Questions
Wiig & Wood, 1995	Test if the concept of regional innovation system can be given a quantitative basis	Questionnaire based on CIS, but adapted to reflect a range of locational issues Sample: 824 firms Responses postal survey: 140 Responses telephone survey: 259 Total: 399 responses (78,4% of contacted firms; 48% of population including non contactable) 110 non respondents	**Economic links and innovation** **1. Importance of general regional factors to firms activities** (likert): presence of related firms in region; presence of suppliers/new technologies; availability of suitable site/premises; marketing services; favourable regional taxes; lower operating costs; possibility of future development/ expansion; availability of finance, capital, investment; presence of major customers/ proximity to markets; **2. Innovation inputs and experiences** (% costs): R&D; purchase of products and licences; trial production and product start-up; product design; marked analysis; internal training of employees; other product and process development costs; **3. Innovation outputs** (% turnover): significantly altered products; slightly altered products; unaltered products; **4**. **Obstacles to innovation**: lack of consulting expertise; resistance to change; insufficient/low quality internal R&D; lack of cooperation possibilities; shortage of support/infrastructure in region; no market/ loss of market/ insufficient knowledge about markets; lack of qualified personnel; lack of risk/investment capital; low expected return; lack of information concerning research/technical programme; insufficient government support; high costs; fear of imitation **Role of external links:** % of sales to markets (regional, national, international) – inward vs outward looking/ links within region and outside: what role? **Availability of skilled workforce:** Importance of regional labour factors for firms activities (likert): availability of specific skills; labour with relevant expertise; quality of labour – education/training; availability of local labour **Regional knowledge/technological infrastructure** **1. Importance of regional infrastructural factors**: proximity of HEI/research centres/ science parks/ technology; availability of research/development grants; possibilities of education/training of employees; availability of freight/storage facilities; proximity to transports links; quality of telecommunications; frequent/reliable transports; **2. Sources of information, expertise or support for innovation**: entrepreneur school; HEI in region; confederation of business and industry; commerce advisory council; municipality; **Role of public support for innovation:** Funding (y/n)

Author	Objectives/Hypothesis	Methodology	Variables/Questions
Asheim and Isaksen (1996)	Analysis of geographical variations in innovation activity; identifies different types of industrial agglomerations and examines innovation performance in 2 agglomerations	Data from CIS. Analysis of extent of innovative activity: total innovation costs of firms and % of sales for new or significantly altered products. Geographical variations: classification of 5 area types 'core-periphery dimension'.	**Geographical variations in innovative activity:** Explained by 2 factors: structural component (industrial and firm structures of areas - % of innovative firms; % of firms in innovative industries; large firms; SMEs); and regional component (geographical variations in % of innovative firms within different industries and size-categories of firms). **Innovation performance:** Innovation costs in*: R&D; Trial production; production start-up.* Importance of objectives for firms' innovation: *Replace discontinued products; Expand product range outside main area; create new markets* Sources of information*: Internal sources; External market sources; R&D institutes; generally available information*
Freel (2000)	The study considers the source, function, geography and strength of innovation related cooperation in West Midlands region	Random stratified sample of 228 manufacturing SMEs (represents a 6,11% response rate) Postal questionnaire	**Questionnaire**: - Internal skills and organisation - Sources of finance - Sources of information - Collaboration
Gertler, Wolfe and Garkut (2001)	To evaluate the extent to which the institutional context and local setting play an important role in determining the innovative behaviour of manufacturing firms in Ontario, Canada.	444 target firms (taken part in government programmes for innovation) 446 control firms (not part of programmes) Sample size: 890 firms which information was in Scott's directory 242 completed questionnaires: 27,2% response rate Firms divided in 8 sectors (CAE 4 digit); stratified by size. Then firms were selected using a systematic sampling procedure with a random start.	**Questionnaire** divided into five sections: 1. Assess the competitive environments firms were facing, as well as the workplace technologies and innovations they were using in their efforts to cope with competitive pressures; 2. Describe the nature firms' relationships with their customers, suppliers and other firms in their industry; 3. Assess the effectiveness of federal and government programs in supporting the firm and the industry; 4. Assess the effectiveness of federal and provincial research centres in supporting the firm and the industry; 5. General information: employment levels, occupational composition, R&D expenditures and sales figures
Carlsson et al. (2002)	Conceptual paper on methodological issues. Considers 'technological systems'.		**Identification of actors** - Snowball method: starting from a product base, each actor is asked to point further participants - Rickne (2001) combined 3 methods: i) identification of products and consulted industry associations and directories for firms producing them ii) interviews w/ firms and associations pointed to further actors (researchers, firms, organisations) which in turn were contacted (snowball effect)

Author	Objectives/Hypothesis	Methodology	Variables/Questions
			iii) citations of important inventions verified and broadened the set of actors
Molina-Morales (2002)	Industrial district – Spanish ceramic tiles Analyses collective knowledge creation and innovation processes. The framework includes a set of conditions under which knowledge flows across firms' boundaries and how institutions shape knowledge diffusion.	1º: Quantitative data about the firms obtained in reports and publications (used for descriptive part of empirical section) 2º: Interviews (personal, non-structured) with experts and representatives from industry institutions and associations (inputs for questionnaire) 3º Survey conducted face to face to managers of firms (population: 149; respondents: 101)	**Survey**: - Technological attributes - Role of the institutions (in R&D activities and support) - Social context - Knowledge transmission - Outcomes (analysis of the differences between district members and non-members with ANOVA)
Asheim et al. (2003)	Analyse the need for SMEs in regional clusters to access innovation support at different geographical levels	Comparative case analysis of regional clusters and innovation systems, focusing on when, for what and for whom RIS is most important 12 case studies (comparative analysis between clusters to compare the extent to which regional factors underlie the success or failure of clusters in addition to industry specific factors)	**Linkages between SMEs, innovations and innovation systems** Identification of: **i)** innovation forms (product, process, organisational); **ii)** mechanisms (R&D, user-producer interaction); **iii)** degrees (radical, incremental); **iv)** geographical scope of linkages (regional, national, international); **v)** localised user-producer learning vs globalised R&D driven innovation (knowledge base: analytical or synthetic) **SMEs, clusters, life-cycles** **i)** Horizontal (competitors) and vertical (suppliers, customers) collaboration; **ii)** relationships between SMEs and large firms (suppliers, spin-offs, larger firms as knowledge reservoirs, dependence, customers – larger firms demand high quality products; **iii)** cluster life-cycles (embryonic, stagnant, rejuvenated) **Social capital and trust** **Regional knowledge infrastructure** **i)** Joint research with regional universities (university-firm linkages, is academic knowledge tuned with SMEs practice?); **ii)** SME formation through academic spin-offs; **iii)** regional education institutes and provision of local, skilled labour pool; **iv)** science parks and incubators; **v)** modes of financing and venture capital.
Dahl (2003)	Knowledge diffusion through informal contacts **Hypothesis**: H1a: Firm specific knowledge is exchanged through informal contacts H1b: Knowledge acquired through informal contacts is	Quantitative study – questionnaire (346 from 19 firms)	i) Working experience in ICT and in different locations; ii) characteristics of present job and parameters in job selection process; iii) reasons for job changes; iv) contact with employees from other firms; v) contact with departments and university staff; vi) need and use of further educational opportunities; vii) importance and reason for membership of labour unions; viii) entrepreneurial spirit and opportunities for establishment of firms in the future. **H1: a)** Do you have informal contact with at least one employee in another firm in

Author	Objectives/Hypothesis	Methodology	Variables/Questions
	valuable to the receiver H2a: Relationships between engineers persist through time H2b: More knowledge will be shared as the employers gain experiences, because of stronger relationships and increased trust (life-cycle) H2c: Firms want to reduce the extent of knowledge sharing with employees in other firms through informal channels to prevent competitors from getting valuable knowledge and secrets		the cluster?; **b)** Do you acquire knowledge through informal contacts that you take advantage in current job? (y/n); **c)** Which type of knowledge do you acquire: general; technical on standard equipment; technical on new products; other?; **d)** How do you rate the value of knowledge that you receive from informal contacts: high; medium; low value? **H2: a)** Who are you in informal contact with: former colleagues; classmates; private friends?; other; **b)** Number of total job changes vs. number of informal contacts; **c)** Experience (nr of years in cluster/industry) vs. nr of informal contacts vs. knowledge acquirement; **d)** Function in firm (R&D, production, management) vs. nr of informal contacts and knowledge acquirement; **e)** formal projects in the past (y/n) vs. nr of informal contacts; **f)** competition clauses (y/n) vs. nr of informal contacts; **g)** network and non-network primary channels for information about current job vs. nr informal contacts
Doloreux (2004)	To study innovation activities of SMEs with respect to in-house technological capability, competitive strategy, innovation process, external sources of information, and tendencies of firms engaging in systemic relationships with other organizations; To examine the nature of regional and more diffused forms of systemic relationships shared by SMEs and other firms and organizations; To understand whether RISs exist in different regions, and the nature and extent of their variations.	Telephone interviews. Random-stratified sample of firms drawn from a directory Firms with 10-250 employees. Only firms connected to leading industrial sectors. Sample of 158 firms in Ottawa and 150 firms in Beauce. Response rate: 35,8% in Ottawa and 30% in Beauce	**1. Firms characteristics** Origin, status and products manufactured Employees, growth and geographical market share **2. Innovation activities** Competitive strategies *(products and price; innovativeness; IT; niche market; network; cluster; FDI; flexibility)* Innovation processes and products, novelty of innovation activities: *Distribution (innovative firms; non-innovative firms)/ Innovation activities (product innovation; product new to the market; process innovation; process new to the market)* R&D activities, types of R&D carried out and patents *(R&D activities; fundamental research; applied research; design/experimental research; patents)* Obstacles to innovation: *high cost of developing new products/processes; lack of investment and financing capital; lack of qualified personnel; lack of marketing capability; lack of network/ cooperation possibilities; lack of external technical information; difficulty to access university expertise; difficulty to access government labs; insufficient knowledge about R&D programmes.* **3. Cooperation with external sources of knowledge** Patterns in the innovation process and their locations: *customers, suppliers, competitors, producer services; research institutes; universities; government; technology transfer organisations; venture capitalists/ Regional, extra-regional, national, international*

Author	Objectives/Hypothesis	Methodology	Variables/Questions
			Forms of cooperation developed for the innovation activity*: Firms: R&D collaborations; informal exchange; vertical relationships/ Institutions: low technology transfers (general information, consulting and library information); high technology transfers (research contracts, joint development and training)*
Iturriagagoitia (2004)	Analysis and measurement of interactions within Innovation networks H1: Interactions are measurable H2: Interactions among agents influence innovative capacity of territories H3: Interactions differ between territories	Use of 'European Innovation Scoreboard' for 17 Spanish regions, 22 variables – Factor Analysis	
Kautonen (2006)	Survey (quantitative): compare firms' abilities to renew, to innovate and to maintain cooperation relations. Interviews (qualitative): to investigate the nature of firms' innovative activities and related external interaction with a special focus on its spatial dimension of interaction patterns	**Quantitative study:** Postal inquiry in 2 regions in Finland Sample: all manufacturing firms employing 10 or more; knowledge intensive business firms employing five or more. Total sample based on data of Statistics Finland Questionnaire sent to managing director/ head of 1175 firms. Responses: 366 (31% response rate) **Qualitative study:** 35 interviews with firms representatives that also responded to survey. Every 10th included in in-depth analysis	**Survey**: - Company profile (unit/plant, employees, turnover, exports, educational level of personnel, main products/services, purchasing and selling activities) - Markets and competition (changes in main markets and competition, location of main competitors, strengths towards competitors, future competitive strategies) - Resources for R&D activities and personnel training (R&D expenses, R&D personnel, training expenses, personnel in training) - Services and know-how acquired from outside the company - Changes and innovations (in functions of the firm, in products and services) - Interest groups and the operating environment (importance of actors in the development of products/services) - Cooperation with customers, suppliers, service providers, other firms, universities, research centres (location, scope of cooperation, models). **Interview:** - Basic information on the firm and its organisation - Market position and strategy - Product, process and organisational development and its resources - External relationships (vertical and horizontal) and innovation-related networks - Innovation environment and regional innovation environment as perceived by the firm executive
Raspe and	Measurement of localised	Survey: 2009 firms in manufacturing and	**Localised knowledge**

Author	Objectives/Hypothesis	Methodology	Variables/Questions
Van Oort (2007)	knowledge economy/ spatial knowledge vs firm level control	business services	Human capital: average educational level Creative capital: density of creative industries in which creative capital is employed Growth potential related to increased accessibility of information through ICT: ICT usage (computer usage per employee per industry) Social, cultural and communicative capital: average degree of communication skills (classification of occupations according to the degree of communicative skills needed for interaction) R&D: sectorally weighted share of R&D employees Density of high and medium tech industries relative to total population Firm self-ratings in terms of technical innovations (new products and processes) Firm self-ratings in terms of non-technical innovations (management, organisation and services) **Results of Principal Component Analysis: 3 factors** 'Knowledge workers': ICT sensitivity; education level; creative economy; communicative skills 'Innovation': Technological and non-technological innovations 'R&D': High and medium tech industries **Firm level control measures (relevant for internalising knowledge externalities)** Firm size: nr full time jobs Firm age: nr years Sector: type of economic activity Absorptive capacity: nr of employed persons in firms that are related with consultancy and R&D occupations (% jobs in research and consultancy / total jobs) Face-to-face contacts (% of personal physical contacts / total of communication forms of business relations) ICT usage (% of contacts by ICT - e-mail or e-commerce / total of communication forms of business relations)
Ujjual (2008)	Analysis of performance, innovation and networks of high technology firms.	Questionnaire 836 questionnaires sent to firms of 5 sectors – stratified sample (158 returned – 19% response rate)	**A: Performance** Firm dimension (turnover, employment, exports); New and improved products introduced and intend to introduce; Proportion of new products of sales; Patenting activity **B: Resources** Full-time staff (manual, clerical, scientific/technical, managerial); % w/ university degree (scientific/technical, managerial); training costs (% of total labour costs); R&D expenditures; R&D department?; innovation cycle (how long from getting an idea to launch?) **C: Collaboration and Cooperation** (suppliers, customers, competitors, research

Author	Objectives/Hypothesis	Methodology	Variables/Questions
			bodies, government bodies, professional/trade, financing). Location of collaborators for innovation: local, regional, national, Europe, world) Frequency of contact with them: 1=infrequent; 5=frequent; 0=no contact Number of collaborative arrangements for each purpose they serve: capital; information; production; recruit; R&D; Marketing **D: Embeddedness** Recruit staff within the region?; Staff mobility encourages to link with other firms?; Activity of firm's founder before start-up: self-employed; unemployed; university; gov. research lab, another firm (in region, country, abroad); % of sales and purchases in these markets: local, regional, national, Europe, world? **E: Innovation** Innovation expenditure (eg: R&D, equipment, patents, licences, training) Importance of sources of innovation (1 to 5): Internal (R&D staff, marketing staff); Market (customers, suppliers, competitors), educational and public (universities, gov.agencies) Importance of objectives in stimulating innovation (1-5): increased productivity; improved products, increased or retained market share; better compliance. Factors hampering innovation (1-5): economic (cost, finance); firm specific (lack of skilled personnel); other (regulations, taxation, imitation by others)
Zizalova (2009)	Characterise innovation strategies of firms using explanatory factor analysis; explore if divergence in innovation patterns is region or firm specific.	Data from Community Innovation Survey	**Engagement in innovation activities (y/n)**: internal R&D; external R&D; acquisition of equipment or software to implement innovations; acquisition of other external knowledge (licence, Know-how), internal or external training for innovation; market introduction of new products and services. **Information sources (Likert)**: internal; suppliers; customers; competitors; consultants, commercial laboratories or private R&D institutes; universities or higher education inst; government or public R&D inst; conferences, trade fairs, exhibitions; journals and technical publications **Innovation cooperation – geographical dimension (y/n)**: country, Europe, world **Effects of innovations (Likert):** increased range of products; increased markets or market %; improved quality; increased production flexibility; increased production capacity; reduced labour cost per unit; reduced material and energy consumption; reduced negative environmental impact and improved safety and health aspects, meeting regulations **Intellectual property protection (y/n)**: patent application; industrial design registration; trademark; copyright **Organisational and marketing innovations (y/n)**: new or changed management system; changed work organisation; changes in relations to other enterprises or

Author	Objectives/Hypothesis	Methodology	Variables/Questions
			public institutions; change in product design or packaging; change in firm's sales and distribution methods.
STUDIES ON TOURISM AND REGIONAL INNOVATION SYSTEMS			
Hjalager et al. (2008)	Understand the dynamics of innovation in tourism in terms of relations between actors and the driving forces and impediments for innovation in tourism. Lay foundations for policy facilitating tourism development. Establish Nordic commonalities in terms of innovation systems in tourism.	10 case studies of successful tourism ventures and destinations across Nordic countries. 60 semi-structured interviews	**Structures, actors and relations** - Nature of relations - strong, weak, formal or informal - Mobilising role of actors – how are new relations created - Diversity, power, history of relations **Driving forces for innovation** - External pressures for changes in the innovation system - Entrepreneurial opportunities - Profit motives - Public sector role - Family ties, trust - Policies - Customers **The outcomes** - Tourism products and services - Educational spin-offs - New management methods and competencies - Networks - Reversed innovation/ reversed business spin-offs - Tourism secondary innovation
Prats, Guia, and Molina (2008)	To identify the key role that innovation and the relationships among actors have on the evolution of tourism destinations, based on the concept of a Tourism Local Innovation System.	1st Definition of list of actors: public administration; private firms (represented by trade associations due to large number); research, training and educational centres; local community institutions Sources: leaflets, brochures, reports, websites. From this list, authors started linking actors that shared same promotional material/ website – construction of a matrix of connectivity among agents 2º Interviews with most relevant agents (most connected actors of each type)	Three basic issues must be described in order to define and properly identify the concept of Tourism Local Innovation System: - Its basic characteristic features; - The determinants of tourism innovation at the local level; - Indicators explaining the behaviour of the system The model has four main blocks: tourism agents, relational aspects, macro-environment and outcomes.

Appendix 3 – Pilot survey (English version)

This survey's main goal is to characterise Tourism related innovation. If your organisation is not exclusive of tourism industry, please, in your answers refer only to the situations regarding tourism innovation and innovation activities.

I. GENERAL INFORMATION

QI.1: Name of your organisation:

QI.2: Location (municipality):

QI.3: Number of employees:

- ☐ Less than 9
- ☐ Between 10 and 49
- ☐ Between 50 and 249
- ☐ More than 250

QI.4: Please, select the classification that is more suitable to your organisation:

- ☐ Accommodation
- ☐ Restaurant
- ☐ Travel agency/tour operator
- ☐ Transportation
- ☐ Rent-a-car
- ☐ Cultural activity
- ☐ Leisure or recreation activity

QI.5: Age of your organisation:

QVI.6: Please indicate the approximate value of your firm's annual turnover:

€

QI.7: Please, indicate the percentage of employees in your organisation with the following educational levels:

Elementary education	%
Secondary education	%
Higher education	%

QI.8: Please, indicate the percentage of employees with a tourism degree:

%

II. INNOVATION AND INNOVATION ACTIVITIES

QII.1: Please indicate the **number of innovations** developed by your firm in the last three years in the following categories:

New or significantly improved tourist good or service, regarding its characteristics or final use ***(Product Innovation)***

_____

New or significantly improved production processes, distribution methods or activities that support tourist goods or services, including significant changes in techniques, equipments and/or software ***(Process Innovation)***

_____

New organisational method in business practices, in workplace organisation or in firm's external relationships, regarding tourism affairs ***(Organisational Innovation)***

_____

New marketing concept or strategy regarding tourism, different from the existent ones or already used by the organisation, considering product design or packaging, product placement, product promotion or pricing ***(Marketing Innovation)***

_____

☐ DK/DA

QII.2: Considering the number of innovations developed in the last three years, which percentage has been **developed in cooperation with other organisation(s)**?

_____ %

QII.3: Considering the sales of your organisation, which percentage results from the **selling of innovations developed** in the last three years?

_____ %

QII.4: Considering the sales of your organisation, which percentage results from the **selling of innovations developed in cooperation with other organisation(s)** in the last three years?

_____ %

QII.5: During the last three years, did your organisation develop any of the following **innovation activities** regarding tourism innovation? (you may select more than one option)

In-house Research and Development (R&D)	*Creative work undertaken within your enterprise to increase the stock of knowledge for developing new and improved products and processes.*	☐
External Research and Development (R&D)	*Same activities as above, but performed by other enterprises (including other enterprises or subsidiaries within your group) or by public or private research organisations and purchased by your enterprise.*	☐
Acquisition of machinery, equipment and software	*Acquisition of machinery, equipment and computer hardware or software specifically to produce new or significantly improved products and processes.*	☐
Acquisition of other external knowledge	*Purchase or licensing of patents and non-patented inventions, knowhow, and other types of knowledge from other enterprises or organisations for the development of new or significantly improved products and processes.*	☐
Training for innovative activities	*Internal or external training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes.*	☐
Market introduction of innovations	*Activities for the market introduction of your new or significantly improved goods and services, including market research and launch advertising*	☐

QII.6: Please indicate which **percentage of your turnover/ budget** is allocated to:

R&D (Research and Development)	%
Software or equipment acquisition	%
Patents/ Industrial property rights	%
Training of employees	%
New marketing/communication strategies	%

☐ DK/DA

III. NETWORKS AND COOPERATION TOWARDS INNOVATION

QIII.1: Is your organisation **engaged in cooperation** with other organisation(s) in order to develop any kind of innovation or innovative activity in travel and tourism?

(If your answer is **NO**, please go directly to question QIII.6)

☐ Yes
☐ No

☐ DK/DA

QIII.2: In what regards **travel and tourism related innovations**, please identify the organisations with which there has been cooperation:

Accommodation	☐
Restaurants	☐
Travel agencies/ tour operators	☐
Transportation	☐
Rent-a-car	☐
Cultural activities	☐
Recreation or leisure activities	☐
Universities/ Higher education institutes	☐
Research Centres/ Units	☐
Training Schools	☐
Funding organisations	☐
Venture capitalists	☐
Government/ public bodies	☐
Consultants	☐
Business Associations	☐
Innovation support organisations	☐
DK/NA	☐

QIII.3: Considering the organisations you selected in the previous question, please indicate their **geographical scope of action**:

Territorial scope / Organisations	Local	Regional	National	International	DK/NA
Accommodation	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐
Recreational or leisure activities	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐

QIII.4: Considering the selected organisations, please indicate the **frequency of contact** regarding **tourism innovation processes**:

Frequency of contact / Organisations	A few times a year	Once a month	Once a weak	Once a day	Almost continually	DN/NA
Accommodation	☐	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐	☐
Recreation or leisure activities	☐	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐	☐

QIII.5: Considering the organisations you selected, please identify the **purpose of cooperation regarding travel and tourism innovation processes:**

Purpose / Organisations	Knowledge creation/ joint R&D	Knowledge exchange	New product development	New process development	New marketing/ communication strategy	Funding/ capital	DK/NA
Accommodation	☐	☐	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐	☐	☐
Recreation or leisure activities	☐	☐	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐	☐	☐

QIII.6: Please classify the following typology of organisations according to their effective contribution for regional tourism innovation (*1=not important; 5=very important*):

Importance / Organisations	1	2	3	4	5	DK/NA
Accommodation	☐	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐	☐
Recreation or leisure activities	☐	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐	☐

IV. REGIONAL KNOWLEDGE INFRASTRUCTURE

QVI.1: Considering the origin of the human resources hired by your organisation, which of the following statements is most suited to the reality of your organisation?

- ☐ Most of the human resources that my organisation hires were trained in Tourism by the universities/schools **located in my region**.
- ☐ Most of the human resources that my organisation hires were trained in Tourism by the universities/schools **located outside my region**.

QVI.2: Please select the **three most important sources of knowledge** for your organisation regarding the development of tourism innovations:

- ☐ Research and Development (R&D)
- ☐ Internal sources (knowledge associated to human resources)
- ☐ Staff mobility between tourism organisations
- ☐ Customers
- ☐ Personal and informal contacts with other organisations or colleagues that work in the region (such as suppliers, competitors or other travel and tourism firms)
- ☐ Generally available information (statistics, reports, technical or scientific publications)

QVI.3: Which of the following options do you consider **the most important knowledge source** for travel and tourism innovation developed by your organisation?

- ☐ Interaction with local/regional organisations
- ☐ Interaction with international organisations or from other Portuguese regions
- ☐ Interaction with organisations from other businesses/industries

V. IMPORTANCE OF REGION'S SPECIFIC FACTORS FOR INNOVATION

QV.1 Please, classify the following factors considering their level of importance for tourism innovation in your region *(1=not important; 5=very important)*:

	1	2	3	4	5	DK/NA
Regional knowledge infrastructure (Universities, Research Centres, Higher education institutes located in the region)	☐	☐	☐	☐	☐	☐
Natural resources	☐	☐	☐	☐	☐	☐
Culture of cooperation among tourism actors	☐	☐	☐	☐	☐	☐
Presence in the region of organisations similar to mine	☐	☐	☐	☐	☐	☐
Networks, norms and mutual trust among tourism actors that facilitate cooperation for mutual benefits (social capital)	☐	☐	☐	☐	☐	☐
Sharing of knowledge, information and know-how among tourism actors	☐	☐	☐	☐	☐	☐
Regional governance structure fostering innovation	☐	☐	☐	☐	☐	☐
Regional skilled workforce (Human Capital)	☐	☐	☐	☐	☐	☐
Shared values, attitudes and a 'common language'	☐	☐	☐	☐	☐	☐

QV.2 In your opinion, which of the following actors usually has the initiative of introducing innovations in Tourism? *(select the **most important** one)*

- ☐ Local/ regional private organisations
- ☐ Central government
- ☐ Multinational corporations
- ☐ Local/ regional public organisations
- ☐ Actors located outside the region

VI. PLEASE, SAY IF YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS:

	Agree	Do not agree nor disagree	Disagree	DK/NA
QVI.1: The relationships among the organisations located in my region help to create and innovation-friendly environment.	☐	☐	☐	☐
QVI.2: Most successful tourist products (goods and services) recently introduced in my region result from the cooperation among different tourism agents.	☐	☐	☐	☐
QVI.3: In my region, I find the necessary conditions to develop tourism innovations.	☐	☐	☐	☐
QVI.4: The relationships between my organisation and other regional organisations allow us to exchange knowledge and information that lead us to learning and innovation.	☐	☐	☐	☐
QVI.5: Universities and research centres located in my region provide tourism-related knowledge that meets the needs of my organisation.	☐	☐	☐	☐
QVI.6: As the number of tourism organisations grows in the region, cooperation among different organisations also increases and becomes a common practice.	☐	☐	☐	☐
QVI.7: When the number of tourists stagnates or decreases, my organisation introduces an innovation in order to rejuvenate the destination and to attract more tourists.	☐	☐	☐	☐
QVI.8: The introduction of tourism innovations is only important when the destination is declining in its physical set and in numbers of tourists.	☐	☐	☐	☐
QVI.9: I need to establish relationships with organisations located outside my region in order to access to knowledge and information that allow me to innovate.	☐	☐	☐	☐

Thank you so much for your cooperation!

Appendix 4 – Pilot Survey (Portuguese version)

Este questionário tem como objetivo avaliar a inovação desenvolvida no sector do Turismo. Se a sua organização não for específica deste sector, por favor, nas suas respostas refira-se apenas às situações que se relacionam com inovação e atividades de inovação desenvolvidas apenas no âmbito do Turismo.

I. INFORMAÇÃO GERAL

QVI.1: Nome da organização:

QVI.2: Concelho:

QVI.3: Número de colaboradores:

- ☐ Menos de 9
- ☐ Entre 10 e 49
- ☐ Entre 50 e 249
- ☐ Mais de 250

QVI.4: Selecione a classificação que melhor se adequa à sua organização no âmbito do sistema turístico:

- ☐ Meio de alojamento
- ☐ Restaurante
- ☐ Agência de viagem/ Operador turístico
- ☐ Transportes
- ☐ Rent-a-car
- ☐ Atividade cultural
- ☐ Atividade recreativa e de lazer

QVI.5: Ano de início da atividade da organização:

QVI.6: Por favor, indique qual o volume de negócios anual aproximado:

€

QVI.7: Por favor, indique a percentagem de recursos humanos da sua organização com os seguintes níveis de formação:

Ensino Básico	%
Ensino Secundário	%
Ensino Superior	%

QVI.8: Qual a percentagem de colaboradores com formação específica na área do Turismo:

%

II. ACTIVIDADES DE INOVAÇÃO

QII.1: Indique o número de inovações desenvolvidas pela sua empresa no sector do turismo, de acordo com as seguintes categorias:

Bem ou serviço turístico novo ou significativamente melhorado relativamente às suas características ou utilização final ***(Inovação de Produto)***

_____

Processos de produção, métodos de distribuição ou atividades de apoio aos bens e serviços turísticos, novos ou significativamente melhorados, incluindo alterações significativas nas técnicas, equipamentos e/ou software ***(Inovação de Processo)***

_____

Novo método organizacional nas práticas de negócio, na organização do local de trabalho ou nas relações externas da empresa no âmbito do turismo ***(Inovação Organizacional)***

_____

Novo conceito ou estratégia de marketing turísticos diferentes dos existentes ou já utilizados pela empresa, ao nível do design do produto, introdução no mercado, promoção ou preço ***(Inovação de Marketing)***

_____

☐ NS/NR

QII.2: Em relação ao número de inovações dos últimos 3 anos, **que percentagem foi desenvolvida em cooperação com outra(s) organização(ões)**?

_____ %

QII.3: Em relação às vendas da sua organização, que **percentagem resulta da comercialização das inovações desenvolvidos** nos últimos 3 anos?

_____ %

QII.4: Em relação às vendas da sua organização, que percentagem resulta da comercialização das **inovações desenvolvidas em cooperação com outra(s) organização(ões)** nos últimos 3 anos?

_____ %

QII.5: Durante os últimos 3 anos, a sua organização desenvolveu alguma das seguintes atividades de inovação, **no âmbito do sector do turismo**? (pode escolher mais do que uma resposta):

Atividades de investigação e desenvolvimento (I&D) dentro da organização	*Trabalho criativo realizado dentro da empresa com o objetivo de aumentar o conhecimento e as capacidades internas (stock de conhecimento) com vista ao desenvolvimento de produtos (bens/serviços) ou processos novos ou significativamente melhorados.*	☐
Atividades de investigação e desenvolvimento (I&D) fora da organização	*Aquisição de serviços de I&D, conforme definidos acima, mas executados no exterior por outras empresas (incluindo outras empresas do grupo) ou por instituições de I&D públicas ou privadas.*	☐
Aquisição de equipamento, maquinaria e *software*	*Aquisição de maquinaria, equipamento, hardware e software específico para produzir bens ou serviços ou implementar processos novos ou significativamente melhorados.*	☐
Aquisição de outros conhecimentos externos	*Compra ou licenciamento dos direitos de patentes e/ou invenções não patenteadas, know-how e outros formas de conhecimento, a outras empresas ou instituições para desenvolver produtos e processos novos ou significativamente melhorados*	☐
Formação para atividades de inovação	*Formação interna ou externa do pessoal da organização com vista ao desenvolvimento e/ou à introdução de produtos ou processos novos ou significativamente melhorados*	☐
Introdução das inovações no mercado	*Atividades de lançamento no mercado de bens ou serviços novos ou significativamente melhorados, incluindo estudos de mercado e campanhas publicitárias de lançamento*	☐

QII.6: Por favor, indique qual a percentagem do orçamento/volume de negócios alocada às seguintes atividades de inovação:

I&D (Investigação e Desenvolvimento)	%
Software ou equipamento	%
Direitos de propriedade industrial/ patentes	%
Formação de colaboradores	%
Novas estratégias de comunicação/ marketing	%

☐ NS/NR

III. REDES E COLABORAÇÃO

QIII.1: A sua organização tem ou teve, nos últimos três anos, relações com qualquer outra empresa ou organização no sentido de desenvolver alguma inovação para o sector do Turismo?

☐ Sim
☐ Não (se selecionar esta opção, passe diretamente para a questão QIII.6)

☐ NS/NR

QIII.2: No que concerne **ao desenvolvimento de atividades/ processos de inovação no sector do turismo**, por favor, selecione o tipo de organizações com as quais desenvolveu relações de cooperação:

Meios de Alojamento	☐
Restaurantes	☐
Agências de viagem/ Operadores turísticos	☐
Transportes	☐
Rent-a-car	☐
Atividades culturais	☐
Atividades recreativas e de lazer	☐
Universidades/ Instituições ensino superior	☐
Centros/ Unidades/ Institutos de investigação	☐
Escolas/ Centros de formação	☐
Instituições financeiras/de financiamento	☐
Capitais de risco	☐
Organismos públicos	☐
Consultoras	☐
Associações empresariais	☐
Agências de apoio à inovação	☐

☐NS/NR

QIII.3: Para as organizações que selecionou na questão anterior (com as quais cooperou para inovar), por favor indique o seu **âmbito territorial**: (pode escolher mais do que uma opção)

Âmbito territorial / Organizações	Local	Regional	Nacional	Internacional	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐

QII.4: Ainda considerando as organizações referidas, por favor identifique a **frequência com que contacta** com as mesmas no âmbito de **processos de inovação no sector do turismo**:

Frequência do contacto / Organizações	Algumas vezes por ano	Uma vez por mês	Uma vez por semana	Uma vez por dia	De forma permanente	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐	☐

QII.5: Considerando as organizações referidas, por favor identifique o motivo específico da colaboração no **âmbito dos processos de inovação no sector do turismo:** (pode escolher mais do que uma resposta)

Motivo da cooperação / Organizações	Criação de conhecimento/ I&D conjunto	Troca de conhecimento/ informação	Desenvolvimento de novo produto	Desenvolvimento de novo processo	Nova estratégia de marketing/ comunicação	Financiamento	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐	☐	☐

QII.6: Classifique as seguintes tipologias de organizações quanto à sua **importância para o desenvolvimento da inovação** para o sector do turismo da sua região: *(1=nada importante; 5=muito importante)*

Grau de importância / Organizações	1	2	3	4	5	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐	☐

IV. INFRAESTRUTURA REGIONAL DE CONHECIMENTO

QIV.1: Considerando a origem dos recursos humanos que contrata, qual das seguintes afirmações se adapta mais à realidade da sua organização?

- ☐ A maioria dos recursos humanos que contrato são formados em Turismo pelas universidades/escolas **localizadas na minha região**
- ☐ A maioria dos recursos humanos que contrato são formados em Turismo por universidades/escolas **localizadas fora da minha região**

☐ NS/NR

QIV.2: Por favor, indique as **três fontes de conhecimento que mais contribuem** para que a sua organização inove no sector do Turismo.

- ☐ Investigação e Desenvolvimento (conhecimento desenvolvido por universidades, centros de investigação, etc.)
- ☐ Conhecimento que os recursos humanos da organização possuem
- ☐ Mobilidade de pessoal entre empresas do sector
- ☐ Clientes
- ☐ Contactos pessoais e informais com outras organizações ou colegas que trabalham na região (tais como fornecedores, concorrentes ou outras organizações do turismo)
- ☐ Informação globalmente disponível (estatísticas, relatórios, publicações técnicas e científicas)

☐ NS/NR

QIV.3: De entre as seguintes opções, qual considera **a mais importante** como fonte de conhecimento para a inovação que a sua empresa desenvolve? *(selecione apenas uma opção)*

- ☐ Interação com organizações locais/regionais
- ☐ Interação com organizações internacionais ou de outras regiões portuguesas
- ☐ Interação com organizações de outros sectores de atividade

☐ NS/NR

V. IMPORTÂNCIA DOS FACTORES ESPECÍFICOS DA REGIÃO PARA A INOVAÇÃO

QV.1 Dos seguintes fatores, por favor, classifique a importância de cada um deles para a inovação desenvolvida no âmbito do sector do Turismo na sua região (*1=nada importante; 5=muito importante*):

	1	2	3	4	5	NS/NR
Infra-estrutura regional de conhecimento (universidades, centros de investigação, instituições de ensino superior)	☐	☐	☐	☐	☐	☐
Recursos naturais	☐	☐	☐	☐	☐	☐
Cultura de cooperação entre os atores do turismo	☐	☐	☐	☐	☐	☐
Presença de organizações similares na região	☐	☐	☐	☐	☐	☐
Existência de redes onde existe confiança mútua entre os atores do turismo, que facilitam a cooperação para obtenção de benefícios mútuos	☐	☐	☐	☐	☐	☐
Partilha de conhecimento, informação e know-how entre os atores do turismo	☐	☐	☐	☐	☐	☐
Estrutura de governância do turismo regional que promove a inovação	☐	☐	☐	☐	☐	☐
Capital humano/ Mão-de-obra regional qualificada	☐	☐	☐	☐	☐	☐
Partilha de valores, atitudes e de uma 'linguagem comum' no sector	☐	☐	☐	☐	☐	☐

QV.2 Na sua opinião, quem é que habitualmente introduz novas formas de inovação em Turismo no destino? *(selecione a mais importante)*

- ☐ Organizações privadas locais/regionais
- ☐ Organismos do governo central
- ☐ Empresas multinacionais
- ☐ Organismos públicos locais/regionais
- ☐ Actores localizados fora da região

☐ NS/NR

VI. POR FAVOR, INDIQUE SE CONCORDA OU DISCORDA DAS SEGUINTES AFIRMAÇÕES:

	Concordo	Não concordo nem discordo	Discordo	NS/NR
QVI.1: As relações que existem entre as organizações da minha região criam um ambiente propício à inovação no sector do Turismo.	☐	☐	☐	☐
QVI.2: Os produtos e serviços turísticos introduzidos recentemente na minha região e com maior sucesso comercial, resultam da cooperação entre diferentes agentes do sector do Turismo.	☐	☐	☐	☐
QVI.3: Na minha região, encontro as condições que necessito para inovar no Turismo.	☐	☐	☐	☐
QVI.4: As relações que a minha organização estabelece com outras organizações da região permitem-nos trocar conhecimento e informação que conduzem à aprendizagem e ao desenvolvimento de inovação.	☐	☐	☐	☐
QVI.5: As universidades e os centros de investigação localizados na minha região produzem conhecimento relacionado com o sector do Turismo que vai de encontro às necessidades da minha organização.	☐	☐	☐	☐
QVI.6: À medida que o número de empresas turísticas cresce na região, a cooperação entre as diferentes organizações também aumenta e torna-se uma prática comum.	☐	☐	☐	☐
QVI.7: Quando o número de turistas que aflui à minha região estagna ou diminui, a minha organização desenvolve algum tipo de inovação de forma a promover o rejuvenescimento do destino e a atrair mais turistas.	☐	☐	☐	☐
QVI.8: A introdução de inovação no Turismo apenas é importante quando o destino turístico se encontra em declínio em termos de infra-estruturas físicas e de número de visitantes.	☐	☐	☐	☐
QVI.9: Sinto necessidade de estabelecer relações com organizações que se localizam fora da minha região para aceder a conhecimento e informação que me permitam inovar.	☐	☐	☐	☐

Muito obrigada pela sua colaboração!

Appendix 5 – Firms' Survey (English version)

This survey's main goal is to characterise Tourism related innovation. If your organisation is not exclusive of tourism industry, please, in your answers refer only to the situations regarding tourism innovation and innovation activities.

I. INNOVATION AND INNOVATION ACTIVITIES

QI.1: During the last three years, did your organisation (Please, select as many options as applied):

- ☐ Introduce a new or significantly improved tourist good or service, regarding its characteristics or final use ***(Product Innovation)***
- ☐ Implement new or significantly improved production processes, distribution methods or activities that support tourist goods or services, including significant changes in techniques, equipments and/or software ***(Process Innovation)***
- ☐ Implement a new organisational method in business practices, in workplace organisation or in firm's external relationships, regarding tourism affairs ***(Organisational Innovation)***
- ☐ Develop a newmarketing concept or strategy regarding tourism, different from the existent ones or already used by the organisation, considering product design or packaging, product placement, product promotion or pricing ***(Marketing Innovation)***

QI.1.1: Was any of the new tourist good or service introduced by your organisation in the last three years:

- ☐ **New to the market** *(if your firm introduced a new or significantly improved tourism product before your direct competitors)*
- ☐ **New only to the firm** *(if your firm introduced a tourism product new only to the firm, despite its previous existence in the market)*

QI.2: Considering the number of innovations developed in the last three years, which percentage has been **developed in cooperation with other organisation(s)**?

_____ %

QI.3: Considering the sales of your organisation, which percentage results from the **selling of innovations developed** in the last three years?

_____ %

QI.4: Considering the sales of your organisation, which percentage results from the **selling of innovations developed in cooperation with other organisation(s)** in the last three years?

_____ %

QI.5: During the last three years, did your organisation develop any of the following **innovation activities** regarding tourism innovation? (You may select more than one option)

In-house Research and Development (R&D)	*Creative work undertaken within your enterprise to increase the stock of knowledge for developing new and improved products and processes.*	☐
External Research and Development (R&D)	*Same activities as above, but performed by other enterprises (including other enterprises or subsidiaries within your group) or by public or private research organisations and purchased by your enterprise.*	☐
Acquisition of machinery, equipment and software	*Acquisition of machinery, equipment and computer hardware or software specifically to produce new or significantly improved products and processes.*	☐
Acquisition of other external knowledge	*Purchase or licensing of patents and non-patented inventions, knowhow, and other types of knowledge from other enterprises or organisations for the development of new or significantly improved products and processes.*	☐
Training for innovative activities	*Internal or external training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes.*	☐
Market introduction of innovations	*Activities for the market introduction of your new or significantly improved goods and services, including market research and launch advertising*	☐

II. NETWORKS AND COOPERATION TOWARDS INNOVATION

QII.1: Is your organisation **engaged in cooperation** with other organisation(s) in order to develop any kind of innovation or innovative activity in travel and tourism?

The relation may be financial, cooperation or partnership in the development of new products or processes, marketing strategies, knowledge creation or knowledge sharing, etc.

☐ Yes
☐ No (if you select this option, please go directly to question QII.6)

☐ DK/DA

QII.2: In what regards **travel and tourism related innovations**, please identify the organisations with which there has been cooperation:

Accommodation	☐
Restaurants	☐
Travel agencies/ tour operators	☐
Transportation	☐
Rent-a-car	☐
Cultural activities	☐
Recreation or leisure activities	☐
Universities/ Higher education institutes	☐
Research Centres/ Units	☐
Training Schools	☐
Funding organisations	☐
Venture capitalists	☐
Government/ public bodies	☐
Consultants	☐
Business Associations	☐
Innovation support organisations	☐
DK/NA	☐

QII.3: Considering the organisations you selected in the previous question, please indicate their **geographical scope of action**:

Territorial scope / Organisations	Local	Regional	National	International	DK/NA
Accommodation	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐
Recreation or leisure activities	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐

QII.4: Considering the selected organisations, please indicate the **frequency of contact** regarding **tourism innovation processes**:

Frequency of contact / Organisations	A few times a year	Once a month	Once a weak	Once a day	Almost continually	DN/NA
Accommodation	☐	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐	☐
Recreation or leisure activities	☐	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐	☐

QII.5: Considering the organisations you selected, please identify the **purpose of cooperation regarding travel and tourism innovation processes:**

Purpose / Organisations	Knowledge creation/ joint R&D	Knowledge exchange	New product development	New process development	New marketing/ communication strategy	Funding/ capital	DK/NA
Accommodation	☐	☐	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐	☐	☐
Recreation or leisure activities	☐	☐	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐	☐	☐

QII.6: Please classify the following typology of organisations according to their effective contribution for regional tourism innovation (*1=not important; 5=very important*):

Importance / Organisations	1	2	3	4	5	DK/NA
Accommodation	☐	☐	☐	☐	☐	☐
Restaurants	☐	☐	☐	☐	☐	☐
Travel agencies/ tour operators	☐	☐	☐	☐	☐	☐
Transportation	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Cultural activities	☐	☐	☐	☐	☐	☐
Recreation or leisure activities	☐	☐	☐	☐	☐	☐
Universities/ Higher education institutes	☐	☐	☐	☐	☐	☐
Research Centres/ Units	☐	☐	☐	☐	☐	☐
Training Schools	☐	☐	☐	☐	☐	☐
Funding organisations	☐	☐	☐	☐	☐	☐
Venture capitalists	☐	☐	☐	☐	☐	☐
Government/ public bodies	☐	☐	☐	☐	☐	☐
Consultants	☐	☐	☐	☐	☐	☐
Business Associations	☐	☐	☐	☐	☐	☐
Innovation support organisations	☐	☐	☐	☐	☐	☐

III. REGIONAL KNOWLEDGE INFRASTRUCTURE

QIII.1: Considering the origin of the human resources hired by your organisation, which of the following statements is most suited to the reality of your organisation?

- ☐ Most of the human resources that my organisation hires were trained in Tourism by the universities/schools **located in my region**.
- ☐ Most of the human resources that my organisation hires were trained in Tourism by the universities/schools **located outside my region**.

☐ DK/NA

QIII.2: Please select the **three most important sources of knowledge** for your organisation regarding the development of tourism innovations:

- ☐ Research and Development (R&D)
- ☐ Internal sources (knowledge associated to human resources)
- ☐ Staff mobility between tourism organisations
- ☐ Customers
- ☐ Personal and informal contacts with other organisations or colleagues that work in the region (such as suppliers, competitors or other travel and tourism firms)
- ☐ Generally available information (statistics, reports, technical or scientific publications)

☐ DK/NA

QIII.3: Which of the following options do you consider **the most important knowledge source** for travel and tourism innovation developed by your organisation?

- ☐ Interaction with local/regional organisations
- ☐ Interaction with international organisations or from other Portuguese regions
- ☐ Interaction with organisations from other businesses/industries

☐ DK/NA

IV. IMPORTANCE OF REGION'S SPECIFIC FACTORS FOR INNOVATION

QIV.1 Please, classify the following factors considering their level of importance for tourism innovation in your region (*1=not important; 5=very important*):

	1	2	3	4	5	DK/ NA
Regional knowledge infrastructure (Universities, Research Centres, Higher education institutes located in the region)	☐	☐	☐	☐	☐	☐
Natural resources	☐	☐	☐	☐	☐	☐
Culture of cooperation among tourism actors	☐	☐	☐	☐	☐	☐
Presence in the region of organisations similar to mine	☐	☐	☐	☐	☐	☐
Networks, norms and mutual trust among tourism actors that facilitate cooperation for mutual benefits (social capital)	☐	☐	☐	☐	☐	☐
Sharing of knowledge, information and know-how among tourism actors	☐	☐	☐	☐	☐	☐
Regional governance structure fostering innovation	☐	☐	☐	☐	☐	☐
Regional skilled workforce (Human Capital)	☐	☐	☐	☐	☐	☐
Shared values, attitudes and a 'common language'	☐	☐	☐	☐	☐	☐

QIV.2 In your opinion, which of the following actors usually has the initiative of introducing innovations in Tourism? *(select the **most important** one)*

- ☐ Local/ regional private organisations
- ☐ Central government
- ☐ Multinational corporations
- ☐ Local/ regional public organisations
- ☐ Actors located outside the region

☐ DK/NA

V. PLEASE, SAY IF YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS:

	Agree	Do not agree nor disagree	Disagree	DK/NA
QV.1: The relationships among the organisations located in my region help to create an innovation-friendly environment.	☐	☐	☐	☐
QV.2: Most successful tourist products (goods and services) recently introduced in my region result from the cooperation among different tourism agents.	☐	☐	☐	☐
QV.3: In my region, I find the necessary conditions to develop tourism innovations.	☐	☐	☐	☐
QV.4: The relationships between my organisation and other regional organisations allow us to exchange knowledge and information that lead us to learning and innovation.	☐	☐	☐	☐
QV.5: Universities and research centres located in my region provide tourism-related knowledge that meets the needs of my organisation.	☐	☐	☐	☐
QV.6: As the number of tourism organisations grows in the region, cooperation among different organisations also increases and becomes a common practice.	☐	☐	☐	☐
QV.7: When the number of tourists stagnates or decreases, my organisation introduces an innovation in order to rejuvenate the destination and to attract more tourists.	☐	☐	☐	☐
QV.8: The introduction of tourism innovations is only important when the destination is declining in its physical set and in numbers of tourists.	☐	☐	☐	☐
QV.9: I need to establish relationships with organisations located outside my region in order to access to knowledge and information that allow me to innovate.	☐	☐	☐	☐

VI. GENERAL INFORMATION

QVI.1: Name of your organisation:

QVI.2: Location (municipality):

QVI.3: Number of employees:

- ☐ Less than 9
- ☐ Between 10 and 49
- ☐ Between 50 and 249
- ☐ More than 250

QVI.4: Please, select the classification that is more suitable to your organisation:

- ☐ Accommodation
- ☐ Restaurant
- ☐ Travel agency/tour operator
- ☐ Transportation
- ☐ Rent-a-car
- ☐ Cultural activity
- ☐ Leisure or recreation activity

QVI.5: Age of your organisation:

QVI.6: Please indicate the approximate value of your firm's annual turnover:

€

QVI.8: Please, indicate the percentage of employees in your organisation with the following educational levels:

Elementary education	%
Secondary education	%
Higher education	%

QVI.9: Please, indicate the percentage of employees with a tourism degree:

%

Thank you so much for your cooperation!

Appendix 6 – Firms' Survey (Portuguese version)

Este questionário tem como objetivo avaliar a inovação desenvolvida no sector do Turismo. Se a sua organização não for específica deste sector, por favor, nas suas respostas refira-se apenas às situações que se relacionam com inovação e atividades de inovação desenvolvidas apenas no âmbito do Turismo.

I. ACTIVIDADES DE INOVAÇÃO

QI.1: Indique se, nos últimos **três anos** a sua organização (pode escolher mais do que uma resposta):

- ☐ Introduziu no mercado um bem ou serviço turístico novo ou significativamente melhorado relativamente às suas características ou utilização final ***(Inovação de Produto)***
- ☐ Implementou processos de produção, métodos de distribuição ou actividades de apoio aos bens e serviços turísticos, novos ou significativamente melhorados, incluindo alterações significativas nas técnicas, equipamentos e/ou software ***(Inovação de Processo)***
- ☐ Introduziu um novo método organizacional nas práticas de negócio, na organização do local de trabalho ou nas relações externas da empresa no âmbito do turismo ***(Inovação Organizacional)***
- ☐ Implementou um novo conceito ou estratégia de marketing turísticos diferentes dos existentes ou já utilizados pela empresa, ao nível do design do produto, introdução no mercado, promoção ou preço ***(Inovação de Marketing)***

☐ NS/NR

QI.1.1. Algum dos produtos (bens/serviços) novos ou significativamente melhorados, introduzidos pela empresa nos últimos 3 anos foi (escolha uma das seguintes respostas):

- ☐ Novo para o mercado *(se a empresa introduziu algum bem/serviço novo ou significativamente melhorado no mercado antes dos seus concorrentes directos)*
- ☐ Novo apenas para a empresa *(se a empresa introduziu algum bem/serviço novo ou significativamente melhorado apenas para a empresa, apesar de poder já existir no seu mercado)*

QI.2: Em relação ao número de inovações dos últimos 3 anos, **que percentagem foi desenvolvida em cooperação com outra(s) organização(ões)**?

%

QI.3: Em relação às vendas da sua organização, que **percentagem resulta da comercialização das inovações desenvolvidos** nos últimos 3 anos?

%

QI.4: Em relação às vendas da sua organização, que percentagem resulta da comercialização das **inovações desenvolvidas em cooperação com outra(s) organização(ões)** nos últimos 3 anos?

%

QI.5: Durante os últimos 3 anos, a sua organização desenvolveu alguma das seguintes atividades de inovação, **no âmbito do sector do turismo**? (pode escolher mais do que uma resposta):

Atividades de investigação e desenvolvimento (I&D) dentro da organização	*Trabalho criativo realizado dentro da empresa com o objetivo de aumentar o conhecimento e as capacidades internas (stock de conhecimento) com vista ao desenvolvimento de produtos (bens/serviços) ou processos novos ou significativamente melhorados.*	☐
Atividades de investigação e desenvolvimento (I&D) fora da organização	*Aquisição de serviços de I&D, conforme definidos acima, mas executados no exterior por outras empresas (incluindo outras empresas do grupo) ou por instituições de I&D públicas ou privadas.*	☐
Aquisição de equipamento, maquinaria e *software*	*Aquisição de maquinaria, equipamento, hardware e software específico para produzir bens ou serviços ou implementar processos novos ou significativamente melhorados.*	☐
Aquisição de outros conhecimentos externos	*Compra ou licenciamento dos direitos de patentes e/ou invenções não patenteadas, know-how e outros formas de conhecimento, a outras empresas ou instituições para desenvolver produtos e processos novos ou significativamente melhorados*	☐
Formação para atividades de inovação	*Formação interna ou externa do pessoal da organização com vista ao desenvolvimento e/ou à introdução de produtos ou processos novos ou significativamente melhorados*	☐
Introdução das inovações no mercado	*Atividades de lançamento no mercado de bens ou serviços novos ou significativamente melhorados, incluindo estudos de mercado e campanhas publicitárias de lançamento*	☐

II. REDES E COLABORAÇÃO

QII.1: A sua organização tem ou teve, nos últimos três anos, relações com qualquer outra empresa ou organização no sentido de desenvolver alguma inovação para o sector do Turismo?

A relação pode ser do tipo financeira/de financiamento, de colaboração ou parceria no desenvolvimento de novos produtos (bens/serviços) ou processos, estratégias de marketing ou de comunicação, criação de conhecimento ou apenas troca de informação ou conhecimento, etc.

☐ Sim
☐ Não (se selecionar esta opção, passe diretamente para a questão QII.6)

☐ NS/NR

QII.2: No que concerne **ao desenvolvimento de atividades/ processos de inovação no sector do turismo**, por favor, selecione o tipo de organizações com as quais desenvolveu relações de cooperação:

Meios de Alojamento	☐
Restaurantes	☐
Agências de viagem/ Operadores turísticos	☐
Transportes	☐
Rent-a-car	☐
Atividades culturais	☐
Atividades recreativas e de lazer	☐
Universidades/ Instituições ensino superior	☐
Centros/ Unidades/ Institutos de investigação	☐
Escolas/ Centros de formação	☐
Instituições financeiras/de financiamento	☐
Capitais de risco	☐
Organismos públicos	☐
Consultoras	☐
Associações empresariais	☐
Agências de apoio à inovação	☐

☐ NS/NR

QII.3: Para as organizações que selecionou na questão anterior (com as quais cooperou para inovar), por favor indique o seu **âmbito territorial**: (pode escolher mais do que uma opção)

Âmbito territorial / Organizações	Local	Regional	Nacional	Internacional	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐

QII.4: Ainda considerando as organizações referidas, por favor identifique a **frequência com que contacta** com as mesmas no âmbito de **processos de inovação no sector do turismo**:

Frequência do contacto / Organizações	Algumas vezes por ano	Uma vez por mês	Uma vez por semana	Uma vez por dia	De forma permanente	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐	☐

QII.5: Considerando as organizações referidas, por favor identifique o motivo específico da colaboração no **âmbito dos processos de inovação no sector do turismo** (pode escolher mais do que uma resposta):

Motivo da cooperação / Organizações	Criação de conhecimento/ I&D conjunto	Troca de conhecimento/ informação	Desenvolvimento de novo produto	Desenvolvimento de novo processo	Nova estratégia de marketing/ comunicação	Financiamento	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐	☐	☐

QII.6: Classifique as seguintes tipologias de organizações quanto à sua **importância para o desenvolvimento da inovação** para o sector do turismo da sua região *(1=nada importante; 5=muito importante)*:

Grau de importância / Organizações	1	2	3	4	5	NS/NR
Meios de Alojamento	☐	☐	☐	☐	☐	☐
Restaurantes	☐	☐	☐	☐	☐	☐
Agências de viagem/ Operadores turísticos	☐	☐	☐	☐	☐	☐
Transportes	☐	☐	☐	☐	☐	☐
Rent-a-car	☐	☐	☐	☐	☐	☐
Atividades culturais	☐	☐	☐	☐	☐	☐
Atividades recreativas e de lazer	☐	☐	☐	☐	☐	☐
Universidades/ Instituições ensino superior	☐	☐	☐	☐	☐	☐
Centros/ Unidades/ Institutos de investigação	☐	☐	☐	☐	☐	☐
Escolas/ Centros de formação	☐	☐	☐	☐	☐	☐
Instituições financeiras/de financiamento	☐	☐	☐	☐	☐	☐
Capitais de risco	☐	☐	☐	☐	☐	☐
Organismos públicos	☐	☐	☐	☐	☐	☐
Consultoras	☐	☐	☐	☐	☐	☐
Associações empresariais	☐	☐	☐	☐	☐	☐
Agências de apoio à inovação	☐	☐	☐	☐	☐	☐

III. INFRAESTRUTURA REGIONAL DE CONHECIMENTO

QIII.1: Considerando a origem dos recursos humanos que contrata, qual das seguintes afirmações se adapta mais à realidade da sua organização?

- ☐ A maioria dos recursos humanos que contrato são formados em Turismo pelas universidades/escolas **localizadas na minha região**
- ☐ A maioria dos recursos humanos que contrato são formados em Turismo por universidades/escolas **localizadas fora da minha região**

☐ NS/NR

QIII.2: Por favor, indique as **três fontes de conhecimento que mais contribuem** para que a sua organização inove no sector do Turismo.

- ☐ Investigação e Desenvolvimento (conhecimento desenvolvido por universidades, centros de investigação, etc.)
- ☐ Conhecimento que os recursos humanos da organização possuem
- ☐ Mobilidade de pessoal entre empresas do sector
- ☐ Clientes
- ☐ Contactos pessoais e informais com outras organizações ou colegas que trabalham na região (tais como fornecedores, concorrentes ou outras organizações do turismo)
- ☐ Informação globalmente disponível (estatísticas, relatórios, publicações técnicas e científicas)

☐ NS/NR

QIII.3: De entre as seguintes opções, qual considera **a mais importante** como fonte de conhecimento para a inovação que a sua empresa desenvolve? *(selecione apenas uma opção)*

- ☐ Interação com organizações locais/regionais
- ☐ Interação com organizações internacionais ou de outras regiões portuguesas
- ☐ Interação com organizações de outros sectores de atividade

☐ NS/NR

IV. IMPORTÂNCIA DOS FACTORES ESPECÍFICOS DA REGIÃO PARA A INOVAÇÃO

QIV.1 Dos seguintes fatores, por favor, classifique a importância de cada um deles para a inovação desenvolvida no âmbito do sector do Turismo na sua região (*1=nada importante; 5=muito importante*):

	1	2	3	4	5	NS/NR
Infra-estrutura regional de conhecimento (universidades, centros de investigação, instituições de ensino superior)	☐	☐	☐	☐	☐	☐
Recursos naturais	☐	☐	☐	☐	☐	☐
Cultura de cooperação entre os atores do turismo	☐	☐	☐	☐	☐	☐
Presença de organizações similares na região	☐	☐	☐	☐	☐	☐
Existência de redes onde existe confiança mútua entre os atores do turismo, que facilitam a cooperação para obtenção de benefícios mútuos	☐	☐	☐	☐	☐	☐
Partilha de conhecimento, informação e know-how entre os atores do turismo	☐	☐	☐	☐	☐	☐
Estrutura de governância do turismo regional que promove a inovação	☐	☐	☐	☐	☐	☐
Capital humano/ Mão-de-obra regional qualificada	☐	☐	☐	☐	☐	☐
Partilha de valores, atitudes e de uma 'linguagem comum' no sector	☐	☐	☐	☐	☐	☐

QIV.2 Na sua opinião, quem é que habitualmente introduz novas formas de inovação em Turismo no destino? *(selecione a mais importante)*

- ☐ Organizações privadas locais/regionais
- ☐ Organismos do governo central
- ☐ Empresas multinacionais
- ☐ Organismos públicos locais/regionais
- ☐ Actores localizados fora da região

☐ NS/NR

V. POR FAVOR, INDIQUE SE CONCORDA OU DISCORDA DAS SEGUINTES AFIRMAÇÕES:

	Concordo	Não concordo nem discordo	Discordo	NS/NR
QV.1: As relações que existem entre as organizações da minha região criam um ambiente propício à inovação no sector do Turismo.	☐	☐	☐	☐
QV.2: Os produtos e serviços turísticos introduzidos recentemente na minha região e com maior sucesso comercial, resultam da cooperação entre diferentes agentes do sector do Turismo.	☐	☐	☐	☐
QV.3: Na minha região, encontro as condições que necessito para inovar no Turismo.	☐	☐	☐	☐
QV.4: As relações que a minha organização estabelece com outras organizações da região permitem-nos trocar conhecimento e informação que conduzem à aprendizagem e ao desenvolvimento de inovação.	☐	☐	☐	☐
QV.5: As universidades e os centros de investigação localizados na minha região produzem conhecimento relacionado com o sector do Turismo que vai de encontro às necessidades da minha organização.	☐	☐	☐	☐
QV.6: À medida que o número de empresas turísticas cresce na região, a cooperação entre as diferentes organizações também aumenta e torna-se uma prática comum.	☐	☐	☐	☐
QV.7: Quando o número de turistas que aflui à minha região estagna ou diminui, a minha organização desenvolve algum tipo de inovação de forma a promover o rejuvenescimento do destino e a atrair mais turistas.	☐	☐	☐	☐
QV.8: A introdução de inovação no Turismo apenas é importante quando o destino turístico se encontra em declínio em termos de infra-estruturas físicas e de número de visitantes.	☐	☐	☐	☐
QV.9: Sinto necessidade de estabelecer relações com organizações que se localizam fora da minha região para aceder a conhecimento e informação que me permitam inovar.	☐	☐	☐	☐

VI. INFORMAÇÃO GERAL

QVI.1: Nome da organização:

QVI.2: Concelho:

QVI.3: Número de colaboradores:

- ☐ Menos de 9
- ☐ Entre 10 e 49
- ☐ Entre 50 e 249
- ☐ Mais de 250

QVI.4: Selecione a classificação que melhor se adequa à sua organização no âmbito do sistema turístico:

- ☐ Meio de alojamento
- ☐ Restaurante
- ☐ Agência de viagem/ Operador turístico
- ☐ Transportes
- ☐ Rent-a-car
- ☐ Atividade cultural
- ☐ Atividade recreativa e de lazer

QVI.5: Ano de início da atividade da organização:

QVI.6: Por favor, indique qual o volume de negócios anual aproximado:

€

QVI.7: Por favor, indique a percentagem de recursos humanos da sua organização com os seguintes níveis de formação:

Ensino Básico	%
Ensino Secundário	%
Ensino Superior	%

QVI.8: Qual a percentagem de colaboradores com formação específica na área do Turismo:

%

Muito obrigada pela sua colaboração!

Appendix 7 – Comparison between innovative and non-innovative tourism firms: statistical tests results

	Innovative sample			Non-innovative sample			Tests' results		
Variables	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**statistic**	**df**	**p-value**
Age	17,14	18,037	162	20,41	16,513	39	t=-1,034	199	0,302
Type of firm by sub-sector			162			39	X^2=33,617	6	0,000
Region			162			39	X^2=1,677	1	0,195
% staff with university degree	38,12	29,917	147	21,67	35,511	36	t=2,847	181	0,005
% staff with education in tourism	29,90	29,298	145	20,00	29,391	36	U=1.997,5		0,026
Networks									
Engagement in networks			162			39	X^2=46,040	1	0,000
Knowledge sources and knowledge infrastructure									
Geographical/ sectoral dynamics			159			35	X^2=0,190	2	0,910
R&D			162			39	X^2=0,937	1	0,333
Human resources			162			39	X^2=0,151	1	0,697
Staff mobility			162			39	X^2=0,007	1	0,936
Clients			162			39	X^2=15,624	1	0,000
Informal contacts			162			39	X^2=3,579	1	0,059
Globally available information			162			39	X^2=6,158	1	0,013
Origin of human resources			146			37	X^2=1,063	2	0,588
Importance of regional factors for tourism innovation									
Overall importance	4,08	0,647	140	3,67	0,815	31	t=3,023	169	0,003
Knowledge infrastructure			153			33	X^2=1,250	4	0,870
Natural resources			161			39	X^2=6,231	3	0,101
Cooperation culture			161			36	X^2=8,356	4	0,079
Tourism cluster			158			39	X^2=19,662	4	0,001
Social capital			158			37	X^2=10,283	4	0,036
Knowledge sharing			159			38	X^2=13,011	4	0,011
Governance fostering innovation			157			34	X^2=9,598	4	0,048

	Innovative sample			Non-innovative sample			Tests' results		
Variables	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**statistic**	**df**	**p-value**
Human capital			157			39	χ^2=9,843	4	0,043
Shared values			158			38	χ^2=7,206	4	0,125
Relevance of all organisations for innovation	3,85	0,613	101	3,49	0,934	24	t=1,789	27,88	0,084
Relevance of tourism firms for innovation	4,09	0,613	146	3,51	0,841	32	t=3,700	38,54	0,001
Relevance of other organisations for innovation	3,62	0,774	107	3,51	1,046	26	t=0,529	31,97	0,600
Regional innovation environment									
Who introduces innovation			156			36	χ^2=4,883	4	0,299
General conditions	2,13	0,865	159	1,82	0,942	39	t=1,980	196	0,049
Innovation and regional networks	1,8	0,493	138	1,7	0,503	35	t=1,113	171	0,267
Innovation and destination development	2,11	0,469	143	2,11	0,461	39	t=-0,074	180	0,941

Appendix 8 – Comparison between the regions of Douro and Aveiro: statistical tests results

	Aveiro			Douro			Tests' results		
Variables	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**statistic**	**df**	**p-value**
Age *	20,86	20.807	81	13,41	13.917	81	t=-2,681	143,18	0,008
% staff with university degree *	35,83	32,710	77	40,64	26,513	70	t=0,983	139,65	0,327
% staff with educ. in tourism *	28,76	30,702	78	31,22	27,745	67	t=0,504	143	0,615
Innovation performance *									
Type of innovator			43			49	χ^2=1,092	1	0,296
Innovation level			81			81	χ^2=3,838	3	0,280
Product innovation			97			109	χ^2=0,002	1	0,966
Process innovation			97			109	χ^2=4,355	1	0,037
Organisational innovation			97			109	χ^2=0,103	1	0,748
Marketing innovation			97			109	χ^2=0,001	1	0,981
% sales from innovation	28,80	25,236	44	36,50	31,398	40	χ^2=1,245	82	0,217
Networks and organisations **									
% innovation in cooperation	25,88	33,768	57	22,36	28,464	53	t=-0,589	108	0,557
% sales from innovation in cooperation	20,03	22,862	39	20,37	24,424	38	t=0,064	75	0,949
Engagement in networks			97			109	χ^2=0,001	1	0,981
Diversity of links	22,47	18,735	47	24,25	17.882	51	t=0,484	96	0,629
% of local links	1,26	1,661	47	1,43	2,309	51	t=0,430	96	0,668
% of regional links	0,77	1,047	47	1,44	2,541	51	t=2,948	96	0,004
% of national links	1,62	2,280	47	1,47	1,678	51	t=-0,364	96	0,717
% of international links	0,77	1,088	47	0,47	0,784	51	t=-1,551	96	0,124
% links for knowledge creation	0,72	1,677	47	0,63	1,661	51	t=-0,284	96	0,777
% links for knowledge sharing	1,57	2,282	47	1,84	2,120	51	t=0,604	96	0,547
% links for new product	1,62	2,017	47	2,08	2,153	51	t=1,093	96	0,277
% links for new process	0,55	1,954	47	1,04	2,039	51	t=1,203	96	0,232
% links for new marketing	1,26	1,859	47	1,53	1,984	51	t=0,704	96	0,483

	Aveiro			Douro			Tests' results		
Variables	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**statistic**	**df**	**p-value**
% links for financing	0,43	1,037	47	0,27	1,060	51	t=-0,712	96	0,478
Knowledge sources and knowledge infrastructure									
Geographical/ sectoral dynamics			95			103	X^2=1,447	2	0,485
R&D			97			109	X^2=1,259	1	0,262
Human resources			97			109	X^2=1,789	1	0,181
Staff mobility			97			109	X^2=0,273	1	0,601
Clients			97			109	X^2=3,287	1	0,070
Informal contacts			97			109	X^2=0,199	1	0,655
Globally available information			97			109	X^2=0,267	1	0,605
Origin of human resources			78			109	X^2=27,646	2	0,000
Importance of regional factors for tourism innovation									
Overall importance	4,07	0,643	87	3,95	0,736	88	t=-1,155	173	0,250
Knowledge infrastructure			94			97	X^2=8,398	4	0,078
Natural resources			97			107	X^2=2,049	3	0,562
Cooperation culture			97			105	X^2=2,008	4	0,734
Tourism cluster			95			107	X^2=1,012	4	0,908
Social capital			95			105	X^2=1,625	4	0,804
Knowledge sharing			96			106	X^2=2,661	4	0,616
Governance fostering innovation			92			104	X^2=3,534	4	0,473
Human capital			96			105	X^2=3,614	4	0,461
Shared values			95			106	X^2=2,935	4	0,569
Relevance of all organisations for innovation	3,72	0,681	59	3,84	0,706	67	t=1,000	124	0,319
Relevance of tourism firms for innovation	3,88	0,698	89	4,09	0,676	90	t=1,992	177	0,048
Relevance of other organisations for innovation	3,62	0,803	63	3,59	0,860	72	t=-0,181	133	0,857
Regional innovation environment									
Importance of regional factors	4,07	0.643	87	3,95	0.736	88	t=-1,155	173	0,250
Overall conditions	2,08	0.895	95	2,04	0.885	108	t=-0,377	201	0,707
Innovation and regional networks	1,75	0.495	82	1,80	0.498	94	t=0,633	174	0,528

	Aveiro			Douro			Tests' results		
Variables	Mean	Std. Dev.	N	Mean	Std. Dev.	N	statistic	df	p-value
Innovation and destination development	2,14	0.435	82	2,07	0.487	102	t=-1,022	182	0,308

* Innovative sample
** Firms engaged in networks